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An Appreciation of an Unusual Service

At a meeting held last week the executive committee of the Chicago Association of Commerce adopted the following resolutions expressing the appreciation of the association of the notable service rendered by the steam roads during the strike of the employees of the Chicago traction lines on June 14, 15 and 16:

Whereas, In the recent emergency created by the withdrawal from service of all the facilities of the street railway and elevated railway lines of the city, the general public was greatly assisted by the immediate action of the steam railroads affording suburban service, the railroads making extraordinary efforts to provide for the tremendous increase in their patronage, not only by using to the fullest extent all equipment at hand, but by bringing in all available equipment within a radius of several hundred miles;

Resolved, That The Chicago Association of Commerce, through its Executive committee, hereby expresses its appreciation of the notable service rendered by the steam railroads, whose efforts contributed in a most efficient manner to the means by which the city was enabled to meet a situation that otherwise could only have resulted in the serious curtailment, if not cessation, of many commercial, industrial and social activities.

The remarkable accomplishment of the Chicago roads, which suddenly found themselves the sole means of transportation for the bulk of the population of the city and were required, with only a few hours' notice, to accommodate over 625,000 people a day in their suburban service, or five times their normal suburban traffic, was described in last week's issue. "Extraordinary efforts" well describes the exertions made by some of the roads that were called upon practically to improvise a suburban service over night or by the roads that on account of their location were called upon to handle the majority of the crowds. The railroads performed a great public service on this occasion, and the Chicago Association of Commerce committee has done a handsome thing in thus making public acknowledgment of its appreciation.

Two and a Half Billion of Foreign Holdings

L. F. Loree, president of the Delaware & Hudson, has received in answer to inquiries sent to all railroads above 100 miles in length replies indicating that at about the first of the present year there were approximately $2,576,000,000 of American railroad securities held abroad. The total as shown by this investigation is only about half of what was estimated by some bankers at the beginning of the European war which probably shows that the early estimates were entirely too high. A classified summary of the replies is published elsewhere in this issue. When James J. Hill, some years ago estimated the needs of American railroads for new capital at over a billion a year his estimate was criticized by Congressmen and others, with no knowledge of the facts, as absurdly high. Time has proved that this estimate was not far from the mark, but must be remembered that European investors have during the past years helped to absorb a part of these securities. If, however, the present capacity of American investors is $1,000,000,000 a year for railroad securities, it would take 2½ years for this market to take back from Europe the European holdings, even if no new capital was provided for railroad purposes for the entire 2½ years. The importance of the fact cannot be overestimated. Squarely facing the fact, is not depreciating the value of American railroad securities as an investment for a moment. Money invested in these securities will be employed in the production of wealth, whereas money invested in war loans of the European governments is employed in the destruction of wealth. Since money, however, is going to seek investment that will give it the highest interest return commensurate with a certain degree of safety, the possible aggregate of securities which may come onto this market, as shown by the European holdings of American railroad securities is impressive.

The Commodities Clause Again

While again declaring that the ownership of stock in a coal sales company by a railroad or by a railroad company's stockholders does not constitute an interest direct or indirect of the railroad company in the coal which the sales company offers to it for transportation, the United States Supreme Court, in the Delaware, Lackawanna & Western case handed down recently, decides that the contract between the sales company and the railroad company cannot legally make the sales company a mere agent for the railroad company. The court has, therefore, ordered the district court to enjoin the Lackawanna from carrying coal sold by the railroad company to the sales company under the contract now in force. When the commodities clause was enacted the Lackawanna formed a coal sales company with which it made a contract, and it is the terms of this contract which so bind and restrict the sales company as to make it a mere agent of the railroad company, that the Supreme Court

now finds to be illegal. The railroad company kept possession of its coal mines and continued to mine coal after the formation of the coal sales company. The contract with the coal sales company provided that the railroad company should receive 65 per cent of the market price of coal at New York, and was also to receive, of course, the legal rate for transporting the coal to New York. The railroad company could sell as much or as little coal to the sales company as it wanted to, and, on the other hand, the sales company could buy coal from no one else, and had to take all the coal which the railroad company wanted to sell it at the market price. The Supreme Court holds that this contract violates both the Sherman law and the commodities clause. It is very careful to point out that there is no intention on the part of the court of objecting to the contract simply because it protected the property interests of the railroad company, but the court finds it illegal because in the attempt to protect these interests the contract made by the sales company went so far as to obviously violate the intention of the commodities clause. It would appear plain from the decision that any one of the anthracite carriers may or may not now have such relations with its affiliated coal sales company as to violate the commodities clause, but, on the other hand, the decision describes clearly the kind of relation which it will not tolerate, and it should be possible for any company to act accordingly.

Wisconsin Upper Berth Law

The decision of the Supreme Court annulling the Wisconsin law of 1911, requiring sleeping-car companies to give the occupant of a lower berth the free use of a part of the space allotted to the upper berth, until the upper is sold, fills six pages and cites 19 decisions; but the statute was so utterly childish that it is not worth while to discuss it. The gist of the basis of the decision is in the paragraph quoted in the abstract of the report printed elsewhere. The wonder is that there are two justices who dissent from the majority's opinion. The dissenting opinions were not put in writing. The Supreme Court of Wisconsin, which reversed the trial court (and is now itself reversed) sustained the statute on the ground that the rule which it prescribed "contributed to the comfort and convenience of the traveling public"; but it could so contribute, even theoretically, only by facilitating the circulation of air, and the evidence showed that this theory was too vague to be worthy of notice. The statute appears to have been one of the worst examples of meddling, pure and simple. An earlier statute (1907) gave the man in the lower berth the option of ordering or not ordering the upper berth to be kept up, or closed; but this was declared unconstitutional, and the 1911 statute was made mandatory: "the upper berth shall not be let down." What is next to be expected is hard to guess. Probably a law requiring the employment as porters of prestidigitateurs who can put a passenger into an upper berth at 1 a. m. without disturbing the sleeping passenger in the lower; with perhaps a paragraph declaring that for a passenger to seek privacy is against public policy. The short cut would be to order upper berths abolished and the price of sections reduced to $1.50; but from the agitator's point of view that is too simple.

The Cost of The National Transcontinental

In an editorial in our issue of May 21, we referred to the fact that the National Transcontinental Railway of Canada, as built by the government, has cost almost three times as much as the original estimate. In another place in the same editorial there appeared the statement "If, as has proved to be the case in Canada, a government will spend three times as much to build a railway as would be spent by a private company," etc. A valued correspondent writes to call attention to the fact that it does not follow, because the government so far exceeded its own estimate, that it spent three times as much as a private company would have. That is manifestly true. In making the statement questioned we had in mind what the government has spent, and what the private railways of Canada are capitalized for. The private railways of Canada, old lines and new, equipped and in operation, are capitalized, according to the official reports, for $53,619 a mile. On the other hand, the latest figure for the cost of the National Transcontinental which we have seen is $98,898 a mile. Furthermore, the National Transcontinental is not finished, in the sense that the private railways are. It is not equipped, and its terminals are not completed. At the rate expenditures have been made on it in the past, how much will it have cost when it is finished? Perhaps it is putting it a little strong to say it has cost three times as much as a private company would have spent; but the government investigating commission said in its report, "the competing roads are only capitalized at from one-third to one-half as much per mile as the National Transcontinental."

STOCK WITHOUT A PAR VALUE

THE committee on railroad bonds and equipment trusts of the Investment Bankers' Association of America is sending out to members of the association a list of ten questions for consideration and discussion. The second of these questions is of particular interest because of the coincidence that it comes at the time of Clifford Thorne's final argument in the rate advance case of the Western roads at Washington. Investment bankers are asked whether the amount of bonds which should be issued to cover new property should be 100 per cent of cost or less. Clifford Thorne argues that the proposed rate advances are for the purpose of making additions and betterments to property from earnings, and that whereas the public is willing to pay rates sufficient to yield a return on the cost of new property, the public is not willing and should not be made to pay the principal.

A strong railroad company can, under present conditions, issue bonds up to 100 per cent of the cost of a comparatively small new line which holds out a fair chance of earning a return on the investment; but this is true only because the equity back of these bonds consists of the seasoned earning power and the credit of the railroad company. It is hardly conceivable that any banking house would finance a new company building a new line up to 100 per cent of the cost through the issue of bonds without any bonus or margin of safety of stock. The tendency to raise new capital through the issue of mortgage bonds up to the neighborhood of 100 per cent of the cost of additions and betterments is generally recognized as one of the dangers of the present railroad situation. Past experience and business practice in other lines both indicate beyond a reasonable question that all of the new railroad capital required for additions and betterments and extensions from year to year should *not* be raised through the issue of mortgage bonds up to 100 per cent of the cost of the improvements.

If, however, a part of the cost of improvements is to be provided for either from current funds, which means surplus earnings, or through the sale of stock, the railroad company has either got to have surplus earnings or has got to find a market for stock. The Chicago, Milwaukee & St. Paul could finance the greater part of the cost of the Pacific coast extension through the sale of the stock to its own stockholders only because it had been paying 7 per cent for years and earning a surplus above dividend requirements. Stockholders, even of this company, however, have had to accept a reduction to 5 per cent, and this was not earned by the new extension for some years after it was opened and may not yet be earned by the new extension.

The laws of many states do not permit the issue of stock below par; but where is the investor to be found who will pay par for stock issued to pay for 30 per cent of the cost of an extension or betterment work when the other 70 per cent of the cost is paid through the issue of 4½ or 5 per cent bonds, which can be sold only at the face value or less, and whose claims as to earnings and assets must be satisfied in full before the stockholder has any equity whatsoever?

A possible solution of this problem and of the problem that is facing the reorganization committees of many of the roads now in the hands of receivers might be furnished through the issue of stock without a par value. Of course, the manner in which any particular railroad company could readjust its finances to permit of the issue of stock without par value would be a specific problem and one which would have to be treated differently, probably, in each different case. The investor, it would seem, might be willing to put new capital into a railroad project if he knew that a part of the cost had been raised through borrowed money—the sale of mortgage bonds—and by taking stock without a par value he was to become an owner of the property and participate pro rata with other owners in profits commensurate with his risk. An analogous argument would apply in the case of reorganizations such as that of the Chicago, Rock Island & Pacific and the Missouri Pacific.

THE EXTENT OF GOVERNMENT OWNERSHIP

ARCHIV FUR EISENBAHNWESEN, the official publication of the Royal Prussian Ministry of Public Works, has recently issued its annual compilation of the railway statistics of the world, showing the mileage, capitalization and the proportion of government-owned and privately-owned lines in each country for the year 1913, with comparisons with previous years. It is stated that, although most of the figures are derived from official sources, it has been necessary to depend in part on unofficial reports. Railways owned by governments are listed as state railways, whether they are actually operated by the government or by private companies. The mileage figures for 1913 are as follows:

EUROPE

Country	Total	Private	State
Germany	39,831	2,998	36,833
Austria-Hungary	28,872	5,293	23,579
Great Britain	23,572	23,572	...
France	31,992	26,350	5,642
European Russia	38,873	14,167	24,706
Italy	11,021	1,878	9,143
Belgium	5,508	2,787	2,721
Luxemburg	328	205	123
Netherlands	2,035	915	1,120
Switzerland	3,039	1,328	1,711
Spain	9,593	9,593	...
Portugal	1,864	1,147	717
Denmark	2,356	1,132	1,224
Norway	1,932	288	1,644
Sweden	9,056	6,175	2,881
Serbia	638	...	638
Roumania	2,351	133	2,218
Greece	1,005	1,005	...
Bulgaria	1,206	...	1,206
European Turkey	1,246	1,246	...
Malta, Jersey, Man	68	68	...
Total	216,396	100,285	116,111

AMERICA

Country	Total	Private	State
Canada	29,468	27,687	1,781
United States	256,823	256,823	...
Newfoundland	773	773	...
Mexico	15,932	3,509	12,423
Central America	2,016	1,655	361
Greater Antilles	3,425	3,275	150
Lesser Antilles	338	338	...
Columbia	625	515	110
Venezuela	637	569	68
British Guiana	104	104	...
Dutch Guiana	375	375	...
Ecuador	655	655	...
Peru	1,728	670	1,058
Bolivia	1,511	1,511	...
Brazil	15,615	8,849	6,766
Paraguay	233	233	...
Uruguay	1,648	1,648	...
Chile	3,981	1,988	1,993
Argentina	20,759	17,249	3,510
Total	356,317	328,094	28,223

ASIA

Country	Total	Private	State
Russian Central Asia, Siberia	9,943	3,100	6,843
China	6,158	6,158	...
Japan, including Korea	6,866	1,968	4,898
British East Indies	34,850	4,362	29,488
Ceylon	606	606	...
Persia	33	33	...
Asia Minor, etc	3,417	2,500	917
Portuguese Indies	51	51	...
Malay States	862	862	...
Dutch Indies	1,783	238	1,545
Siam	706	105	601
Cochin China, etc	2,310	2,310	...
Total	67,591	23,298	44,292

AFRICA

Country	Total	Private	State
Egypt	3,716	790	2,926
Algiers and Tunis	3,988	2,175	1,813
Belgian Congo Colonies	868	868	...
South African Union:			
Cape Colony	3,999	548	3,451
Natal	1,109	...	1,109
Central South Africa	3,488	157	3,331
Rhodesia	2,420	2,420	...
Colonies—			
Germany:			
German East Africa	896	...	896
German Southwest Africa	1,315	...	1,315
Togo	204	...	204
Kamerun	193	...	193
England	2,368	1,047	1,321
France	2,011	2,011	...
Italy	96	96	...
Portugal	1,015	1,015	...
Total	27,693	11,129	16,564

AUSTRALASIA

Country	Total	Private	State
New Zealand	2,906	30	2,876
Victoria	3,693	25	3,668
New South Wales	4,120	167	3,953
South Australia	2,326	234	2,092
Queensland	4,845	296	4,549
Tasmania	705	196	509
West Australia	3,449	579	2,870
Hawaii, etc.	88	88	...
Total	22,136	1,615	20,521

SUMMARY

	Total Mileage		State		Private	
	1913	Gain	1913	Gain	1913	Gain
Europe	216,396	2,256	116,111	1,590	100,285	666
America	356,317	9,990	28,223	5,841	328,094	4,149
Asia	67,591	1,498	44,293	152	23,298	1,346
Africa	27,693	1,002	16,564	613	11,129	389
Australasia	22,136	385	20,521	1,448	1,615	1,063*
Totals	690,133	14,206	225,712	9,644	464,421	5,487

*Loss.

Of the total mileage of the world for 1913—690,133 miles—private companies owned 464,421 miles, or 67 per cent, and governments owned 225,712 miles, or 33 per cent. In 1912 the private railways owned 68 per cent. The government railways gained one per cent by increasing their mileage by 9,644 miles, while the mileage of private companies increased only 5,487 miles.

However, an analysis of the statistics given for the various countries shows that this gain by the state railways represented the absorption of existing lines rather than greater activity in railway construction. For example, 4,478 miles of line were added to the government total in Mexico, and 1,002 in Argentina, without any increase in the total mileage of the country. In Australasia there was also a gain of 1,448 miles for the government lines by the absorption of private lines, although the total mileage of the country increased only 385 miles. The privately-owned lines, therefore, actually increased their mileage by construction 12,000 miles, of which about 6,500 miles was offset by the acquisition of lines by the governments.

It will be noted that, in respect of length of lines, outside of North and South America, government ownership greatly predominates, but that the privately-owned mileage in the United States, 256,823, greatly exceeds the mileage of all the government-owned roads in the world. It is somewhat surprising, however, to find that the greatest increase in government mileage is in North and South America, due to the absorption of private lines in Mexico and Argentina. Even outside of the United States, however, private ownership is greatly predominant in America. Excluding our 256,823 miles, there are in this hemisphere 71,261 miles of private railways, against 28,223 miles of government railways. In only two countries in this hemisphere, Mexico and Peru, is government ownership the predominating policy, and in Peru the roads are operated by companies.

In a majority of the countries of the world, also, private ownership of railways continues to prevail. Of 75 nations and colonies for which statistics are given in this compilation, 42 have more private than government mileage, while 33 have more government mileage. While in 26 countries the entire railway mileage is privately owned, in only 7 are all of the railways owned by the state. These are Serbia, Bulgaria, Natal and four

German colonies in Africa. In Europe state ownership predominates in only 10 out of 21 countries.

All the railways of the United States, Great Britain, Spain, China and Rhodesia are in the hands of private companies, and most of those in Canada; in France four-fifths of the mileage is privately owned, in Sweden nearly two-thirds and in Brazil and Argentina company mileage is greatly predominant. In Germany, Austria-Hungary, Russia, Italy and Japan government ownership is the dominant policy.

Of the total railway mileage of the world for 1913, over 37 per cent was in the United States. The total increase for the year was about 15,000 miles, of which 5,019, or about one-third, was reported for the United States, although this figure for this country is undoubtedly too high. The increase for the world was less than the gain reported in 1912 or 1908.

The total railway capitalization of the world as reported by this publication was $60,222,036,784. In this is included, however, over $19,000,000,000 as the capital of the railways of the United States, which erroneously includes all the duplications due to inter-corporate ownership. The Interstate Commerce Commission's figure for 1913 is $15,330,131,446. With this correction the world's total in 1913 stood at $56,350,804,230, an increase over the preceding year of $1,848,250,566. The average capitalization per mile for the world was $82,313, as against $65,861 for the United States. The average for Europe was $70,656, and 18 countries are reported as having a greater railway capitalization per mile than the United States. It will be noted that while this country has 37 per cent of the world's mileage, only 27 per cent of the total capitalization is chargeable against the railways of the United States.

JAMES J. HILL PROFESSORSHIP OF TRANSPORTATION

PRESIDENT LOWELL announced at the commencement exercises of Harvard University that a gift of $125,000 had been received to endow the "James J. Hill Professorship of Transportation" in the Harvard Graduate School of Business Administration. A list of the donors and some other information regarding the establishment of this new chair are given elsewhere in this issue.

The endowment of this professorship is a tribute to Mr. Hill; and surely no tribute ever was more deserved. Take him all in all, he is probably the greatest genius who ever devoted his energies to railway transportation. He has been equally pre-eminent as a railway builder, as an operating executive, as a traffic manager and developer and as a financier. The various lines now constituting the Great Northern Railway were laid out and constructed so successfully under his immediate direction. He is the father of the "tonnage system"—the system of the largest practicable train loads, which has done more to promote economy in railway operation than any other practice ever introduced into it. He established a system of rate making on the Great Northern which has contributed enormously both to the development of the Northwest and to the upbuilding of a profitable traffic for the railways in that section. He has caused the railways which he has controlled to be so skillfully financed, as well as to be so efficiently developed and operated, that, considered as a whole, the great system which he dominates is one of the most prosperous in the world. Probably America has produced no other man who has combined in more pre-eminent degree the greatest qualities of both the business man and the statesman. We say "America" because, although he came to the United States when young, Mr. Hill was born in Canada.

Not only is the tribute paid to Mr. Hill so well deserved, but the establishment of the professorship itself is highly gratifying. Never was there in any country such need of a thorough and impartial study and exposition of transportation problems as there is in the United States at the present time. The railways of this country have 37 per cent of the total mileage of the globe. Whether viewed from this standpoint, or that of the traffic they handle, the investment they represent, the number of men they employ, or their relative position in industry, our railways are very much the most important system in the world. For many years we have been confronted with the "railway problem"—the problem of how to regulate the railways, or as to whether the government should acquire and manage them. Never, apparently, was this problem farther from solution than now. It is a problem in the solution of which it would seem that the schools could help very materially. But although the United States has many universities in which some attention is given to transportation, it is a regrettable fact that most of them have contributed little, and many of them less than nothing, to the solution of this problem. Here and there are professors of economics and of transportation who realize that no man can safely draw definite conclusions regarding this problem's many important phases without having first spent some years in familiarizing himself with the history of railways and with the multifarious, complex and widely varying facts regarding their operation, rate-making, financing, etc. But thus far the good work of these men has been more than offset by that of the much larger number who have been willing to reach their conclusions first and find facts to fit them afterward, if indeed they ever find them at all. If many of the professors betray as much ignorance and bias in their class rooms as they do in their writings on railway subjects, it is easy to understand why so many of our young men graduate with their heads stuffed with misinformation and foolish hypotheses concerning railway matters.

The main function of a chair of transportation should not be the industrious formulation and elaboration of baseless hypotheses regarding the nature of the railway business, but the ascertainment and teaching of facts regarding it. If there be suggested some conclusions based on the facts ascertained, this is also a useful service. The Harvard School of Business Administration already has achieved a high reputation for the excellence of the research work and teaching done by its professors. It is reasonable to assume that in filling the James J. Hill Professorship the university authorities will show a high regard for the proprieties by apportioning to it a man whose knowledge of both the theory and the practice of transportation are such as will enable him to impart to students real knowledge. A wider diffusion of real knowledge of the subject is one of the greatest needs of the country, and Harvard can render no greater service than to set the example of imparting such knowledge to the nation's studious and ambitious young men.

Perhaps a word will not be out of place in this connection regarding those who have done most to secure the establishment of the James J. Hill Professorship. Probably those who have been most active in bringing it about are Howard Elliott, chairman and president of the New York, New Haven & Hartford, and Thomas W. Lamont, of J. P. Morgan & Co. Both of these gentlemen are graduates of Harvard, and in furthering the creation of this professorship they have rendered a service not only to their alma mater, but also to the public.

NEW BOOKS

Statistics of Railways in the United States; Twenty-sixth Annual Report. 751 pages, 9 in. by 12 in. Cloth. Prepared by the Interstate Commerce Commission, Division of Statistics. Issued by Superintendent of Documents, Government Printing Office, Washington, D. C. Price $1.

The present volume is for the fiscal year ending June 30, 1913. The principal totals for the whole country, as given in this report were printed in the *Railway Age Gazette,* July 17, 1914, from a preliminary abstract sent out by the Interstate Commerce Commission. The first 62 pages of this report, giving the tabular summaries, came out last December and was noticed in the *Railway Age Gazette,* December 11, page 1074. At that time the commission expected the complete volume to be out in one month.

Letters to the Editor

DOES LABOR CREATE ALL WEALTH?

NEW YORK.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

Warren S. Stone, grand chief of the Brotherhood of Locomotive Engineers, in the wage arbitration at Chicago repeatedly took the ground that labor produces all the wealth that exists, and, therefore, should come into the possession of all of it.

This seems to be a revival of an archaic notion. From pages 402, 403 and 406 of Webb's "Industrial Democracy" (a strongly favorable presentation of Trade Unionism), I quote the following:

"The operative bootmaker has inherited a rooted belief that the legitimate reward of labor is the entire commodity produced, or its price in the market. This idea was the economic backbone of Owenite Socialism, with its projects of Associations of Producers and Labor Exchanges. In the first number of the "Poor Man's Guardian," a widely-read journal of 1831, it was expressed in the following verse:

> "Wages should form the price of goods;
> Yes, wages should be all,
> Then we who work to make the goods,
> Should justly have them all:
> . . . . .

"The same idea inspired the proposals of Lasalle, and most of the inferences drawn from Karl Marx's 'Theory of Value,' whilst it still lingers in the declarations and programmes of German Socialism and its derivatives. . . .

"Though the Owenite assumption here referred to was formerly accepted by large masses of English workmen, and though it still lies at the root of the desire for Co-operative Associations of Producers, it cannot be said to characterize the Trade Unionism of the present day, and it will accordingly not be discussed in our chapter on 'The Assumptions of Trade Unionism.' . . .

"If the operatives desire to maintain the modern Trade Union principle of the Standard Rate, they must abandon, once for all, the diametrically opposite assumption that 'wages shall be the price of goods.' . . ." F.

RAILROAD ADVERTISING

NEW YORK.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

I am aware that a layman has little business to butt into your columns. And yet sometimes the man outside the business can get a perspective that the railroader himself fails to vision. It is for this reason I make bold to address sundry observations to the *Gazette*.

These remarks were brought to a head by the admirable article on railway advertising by Edward Hungerford, published in one of your recent issues. Mr. Hungerford's article, excellent in everything touched on, failed to treat of certain details which have been somewhat painfully brought to my attention.

As manager of the Travel and Resort department of a leading magazine, I have an unquenchable thirst for information regarding passenger and more especially tourist traffic.

It has been my observation that in the Broadway ticket offices are many clerks who are grossly ignorant of the lines which they represent. I have frequently encountered clerks who did not know certain essential facts relative to passenger service which were familiar to me, an entire outsider. One illustration will suffice. In the mountains of a neighboring state is located a mountain resort fairly well known. It lies on a branch line just off one of our great systems. The writer 'phoned to the chief branch ticket office of this line and asked the clerk to give the nearest station on his line to this resort. After considerable delay and evident consultation this individual replied: "About this here—(naming the resort). There ain't no such place on our line." And yet the place in question is listed in the system's summer book as among its particular attractions!

My advice to the G. P. A.'s is to conduct a course of instruction in railroad geography. Also in the dull season to round up all the ticket counter staff and take them out to see where and how the road actually goes. Such an excursion would result in more tickets being sold. It requires imagination to talk intelligently and compellingly of places you have never actually seen with your own eyes. Imagination is not a conspicuous quality in the ticket clerk. He sells transportation in most cases automatically. If he had a quarter of the courteous suggestion and clear intelligence found in the salesman of our high grade retail stores the road he represents would sell more transportation. If Mr. Ticket Buyer who has decided to take a trip to what we may call Mount Lookout is politely told he should not miss the scenic glories of the Sapphire Lakes, which are only 150 miles beyond on the same system and can be included in an attractive excursion rate for just a little more, nine times out of ten he will welcome the suggestion and purchase more transportation than he had intended.

Another criticism arises every spring. It is prompted by efforts to obtain the summer transportation literature in good season. There are always many laggards who are late with their summer booklets. They have all winter, presumably, to get this literature off the press. Yet in the first week in June I always receive circular post cards somewhat similar in their wording to the following from one of the leading summer tourist roads:

"Your request for our 1915 Summer Book is received today, and will be complied with immediately upon receipt of books from printer. The large amount of work entailed has slightly delayed the issuance of these books, but it is expected that they will be ready for distribution by June 5. Regretting the unavoidable delay, and thanking you for your interest, we are——"

The road that sends out this card has been advertising its resorts extensively. Every advertisement mentions the summer booklet. Readers who answer the ads get the above replies. Imagine such methods applied to retail trade, and yet the sale of tourist transportation is precisely the same in theory and should be the same in practice as the sale of watches.

There is also a deplorable lack of system in maintaining mailing lists of persons who should receive folders, etc. The writer maintains a complete file of folders, revised twice a year, and yet not a dozen roads mail him their literature unless written to semi-annually. My address should be always retained on a well arranged mailing list. Yet I am obliged to send a circular request out to several hundred G. P. A.'s twice each year.

If the same general methods of circularizing used by any big, first-class business were followed by the railroads' passenger departments there would be a heap more tickets sold.

Very beautiful, complete, and well written are the summer booklets this year, but in their intelligent distribution there is woeful lack of system or enterprise. OUTSIDER.

PORTUGUESE RAILWAY RATES INCREASED.—The Portuguese railway companies have notified the public that, in view of the enhanced cost of fuel and other materials in consequence of the war, a general increase has been decided upon in all rates and fares, amounting to about 10 per cent. This action on the part of their neighbors will possibly surprise the people in Spain who have been agitating recently for a reduction in railway rates on the same grounds. Imported coal is now costing, in the peninsula, almost double the July prices, and Spanish coal has increased almost as much, the local mine owners having taken advantage of the situation to raise their prices. To counteract this the government has suspended the protective customs duties temporarily. An attempt is also being made to introduce Pocahontas coal from this country. Welsh steam coal is being quoted at 60s. ($15), and Pocahontas at 53s. ($13.25), c. i. f., Mediterranean ports.

The Test Department of the Pennsylvania Railroad*

Brief History and Outline of Its Present Scope; Description of the New Physical and Chemical Laboratory

By C. D. Young

Engineer of Tests, Pennsylvania Railroad, Altoona, Pa.

Endeavoring to promote the safety of passengers and employees on its lines by minimizing or eliminating, if possible, all accidents traceable to defective or unsuitable material, the Pennsylvania Railroad has found that the quality of the material purchased for use in rails, bridges, cars and locomotives must be carefully scrutinized. Control over the quality of supplies is secured by the aid of specifications, which are based upon careful consideration of the materials available for the various uses of the railway, and by research work tending toward the development of new materials and devices, or improving those which are in general use. Neither the reputation of the manufacturer nor a superficial inspection of the materials offered has been found to be a sufficient safeguard in the purchase of supplies, since frequently the manufacturer himself has no positive knowledge of the strength or other physical properties of the iron, steel or other metals, nor the purity of many of the articles offered for sale.

An organization with laboratories at a central point is an essential in promoting the work of thorough inspection, the importance of which is unquestioned. With this inspection, accidents to the traveling public and the employee have been reduced, and efforts in the future will be towards their further reduction. It is desirable, therefore, that the public be fully informed as to the facilities provided by one of the largest railroad companies for making tests of all its supplies and conducting investigations with a view of obtaining the best materials which can be commercially furnished.

The Department of Tests of the Pennsylvania Railroad—the first of an American railroad—has grown in the following way:

In 1874 there was established at Altoona a department of physical tests, the organization of which was placed under the direction of Theodore N. Ely, then superintendent of motive power. The first testing machine was purchased during the early part of the year. It was of 50,000 lb. capacity and was furnished by Fairbanks and Ewing. The first test was made on April 2, 1874.

In the beginning, the testing work was conducted by the master mechanic of the Altoona shops, but in August, 1874, the department of physical tests was placed in charge of John W. Cloud, who became the first engineer of tests. A chemical laboratory, under the direction of the late Dr. Charles B. Dudley, was added in the autumn of 1875. Research work for the improvement of rails was begun, and the investigations and accumulation of experience, which later made possible the preparation of a series of "Standard Specifications," had their start.

It was not until 1879, or five years after the beginning of the testing of materials, that the physical and chemical departments were provided with a separate building. This building was a one-story frame structure, 25 ft. by 45 ft. These quarters were soon abandoned, however, and until 1914 space was made

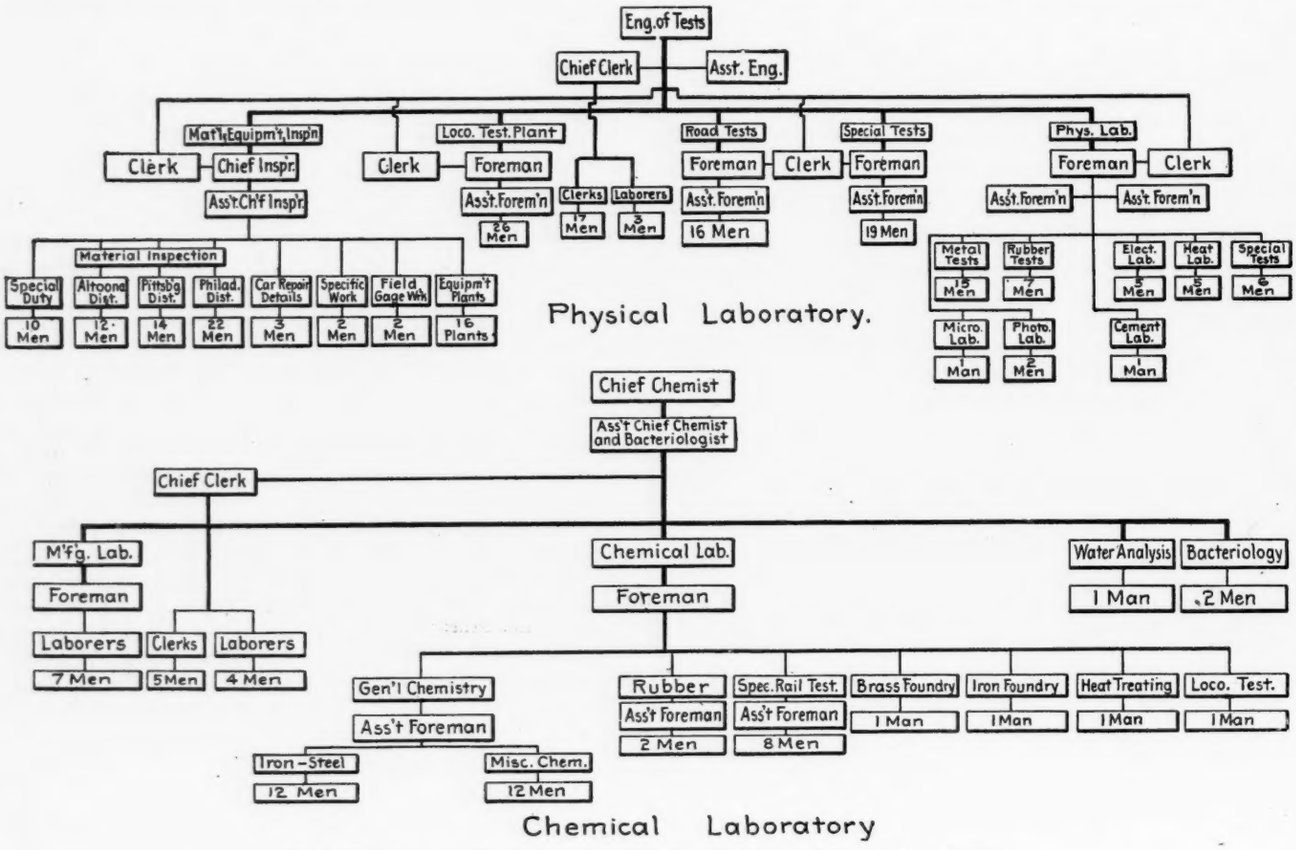
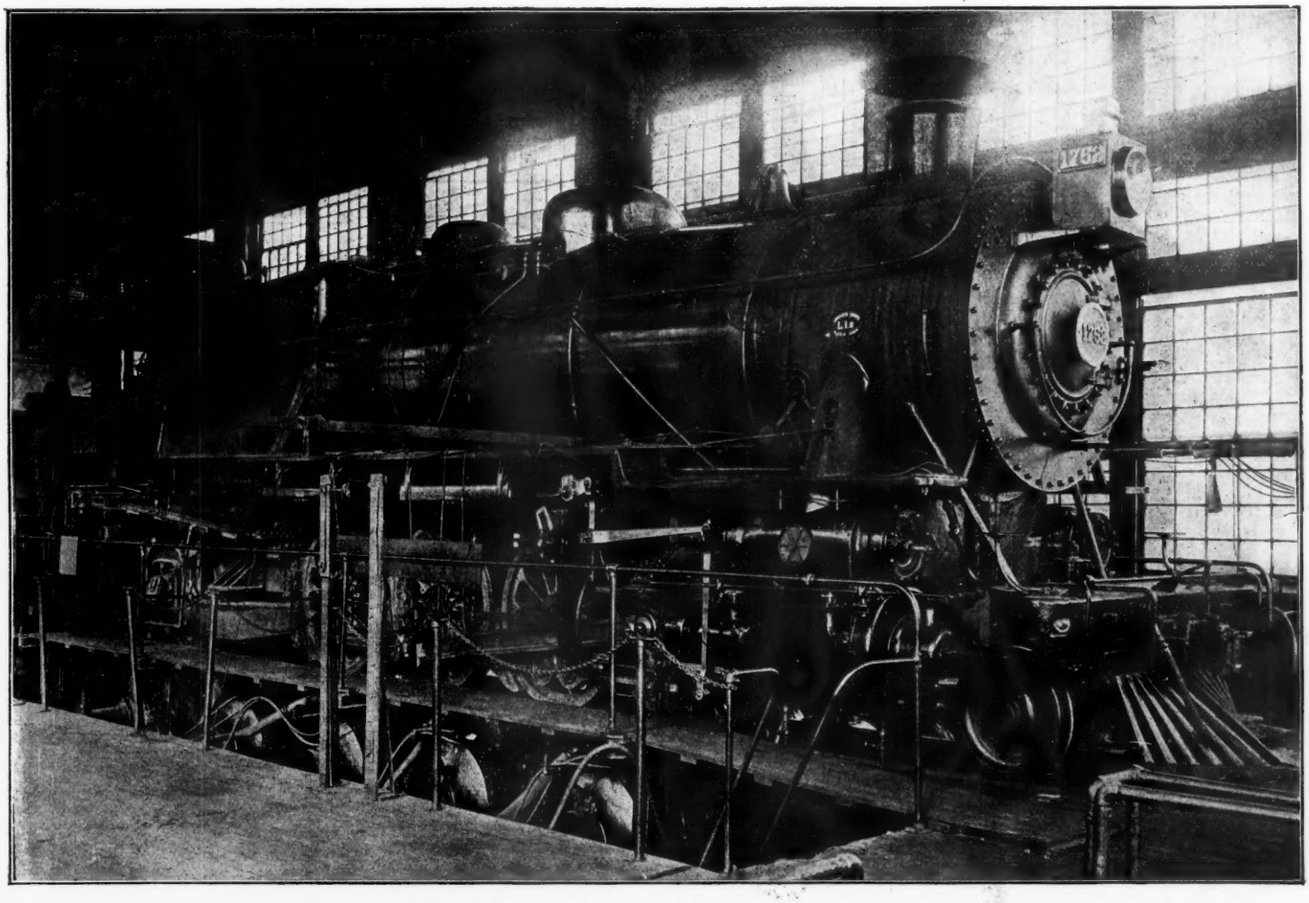


Chart Showing the Organization of the Department of Inspection and Tests

*From a paper read at the annual meeting of the American Society for Testing Materials, Atlantic City, N. J., June 22-26, 1915.

available in a part of the shop office and storehouse building, where the departments finally occupied 15,476 sq. ft. of floor area on four floors. That the growth of the departments has been rapid is also evidenced by the diagram, which shows the number of employees, the number of routine physical tests, and the number of standard specifications in force for each year from 1874 to 1914. The quarters having become congested in the past few years, a new building with a floor area of 41,000 sq. ft. was begun in 1913 and completed in 1914. Thus, in 35 years the requirements of the departments, as shown alone by the floor space occupied, have increased more than 35 times; or, there has been an average increase of over 100 per cent for each year since the work began. The growth of the test department and laboratory has been very much more rapid than the increase in tonnage hauled, or the extension of the general business of the railroad. The reason for this is that there was almost as wide a field for the application of specifications, and the inspection and testing of materials, in the beginning as at the present time.



The Locomotive Testing Plant, with a Mikado Type Locomotive in Position for Testing

THE NEW BUILDING

The new building at Altoona which has just been occupied is constructed of reinforced concrete, the reinforcement being of twisted bars. Structural steel cores are used in the concrete columns. The whole exterior is finished in red brick and red terra-cotta. It is arranged with a central service portion consisting of the middle bay which contains a stairway and an electric elevator, giving access to all parts. On the basement floor of the service section there is a receiving room for materials. This room communicates with the elevator for the distribution of small samples to the different sections of the building, while large pieces may be lifted to the physical-test section by means of a ten-ton traveling crane with a hatchway in the main floor. There is a machine room in the basement and in this all of the metal test specimens are prepared. On this floor there are two large fireproof vaults for the storage of letter files and the like, and a room for chemical stores.

The first or street floor is devoted to physical tests. It contains a physical laboratory with five universal tension and compression testing machines, the largest of which has a capacity of 1,000,000 lb., and all are served by the traveling crane. On this floor are separate sections for oil, cement and lagging, hose, rail, miscellaneous and heat-treatment tests.

The second floor is used for office, locker and toilet rooms, the south end being occupied by the office force of the engineer of tests and the north end by that of the chief chemist.

The third floor is divided into laboratory rooms for bacteriology, rubber, water and gas analyses, photometry and lamp tests, and the calibration of electric instruments.

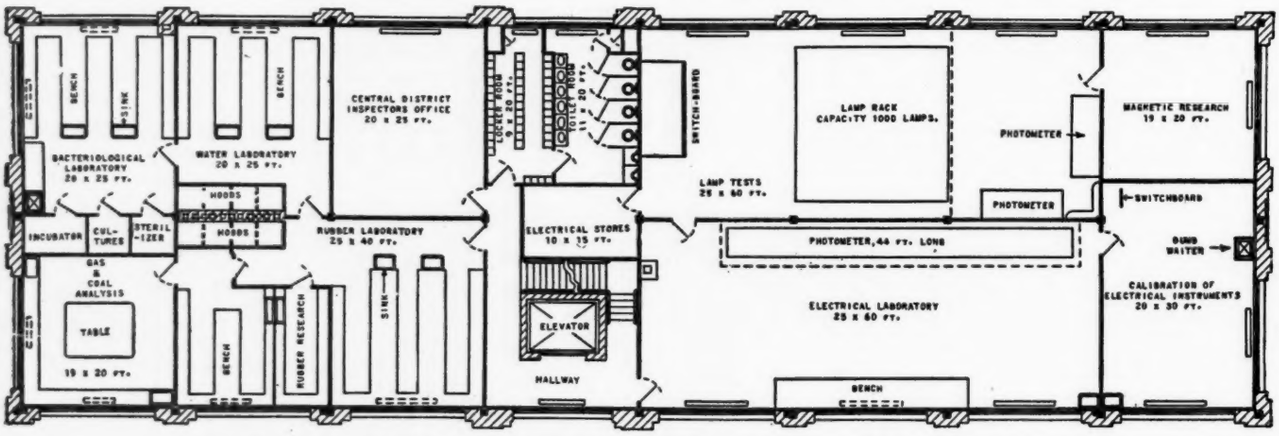
The whole fourth floor is used as a general chemical laboratory with a separate chemical balance room. The central bay is extended up to form a fifth floor, which comprises a photographic studio and dark room, while the roof of the remaining portion of the building is used for experimental work and tests where exposure to the atmosphere is required.

Direct lighting with tungsten lamps is the system of illumination. "Abolite" metal reflectors are used in the basement and on the first floor, with "Pyro" glass reflectors on the second or office floor. In the chemical laboratory, where metal would be injuriously acted upon by gases, "Holophane" glass reflectors are in use. All of the lighting and power conduits were placed in the floors before pouring the concrete. Telephone, dictaphone and buzzer systems are installed in the floor conduits, and in addition great flexibility is possible in the location of these fixtures by the use of a chair rail around the walls

of each room, the chair rail having three separate grooves for wires.

The building is heated by direct steam radiators with a single pipe system, and the radiators are placed under the windows. A hot water service, with a heating and circulating tank in the basement is provided. The gas, steam, air, water and hydraulic lines are of open work, and all pipe risers are in a common

One vibratory endurance spring testing machine of 75,000-lb. capacity,
One 43-ft. drop-testing machine;
Two vibrating staybolt testing machines;
One Brinell hardness testing machine;
One 2,000-lb. cement testing machine;
One horizontal microscope, with camera for metalographic work;
One grinding, buffing and etching outfit for the preparation of samples for microscopic work.



Plan of the Third Floor, Giving an Idea of the Floor Layout in the New Building

conduit which is located in the central service bay of the building.

The interior of the building is finished in natural chestnut throughout, with the exception of the office rooms, which are finished in imitation mahogany. All interior doors and partitions are glazed. The floors, with the exception of the basement where

The General Laboratory in the Laboratory Car

the floor is of concrete and the physical laboratory where it is of wood on concrete, are of magnesium-cement composition.

It is noteworthy that the building was constructed and equipped complete within the original estimates and appropriation. The building itself cost about $150,000. An estimate of the value of the contents is, for the physical laboratory, $100,000; and for the chemical laboratory, $25,000. With equipment complete, the investment for the laboratories is about $275,000.

PHYSICAL LABORATORY

Among the machines and apparatus that compose the equipment of the physical laboratory, there are the following:

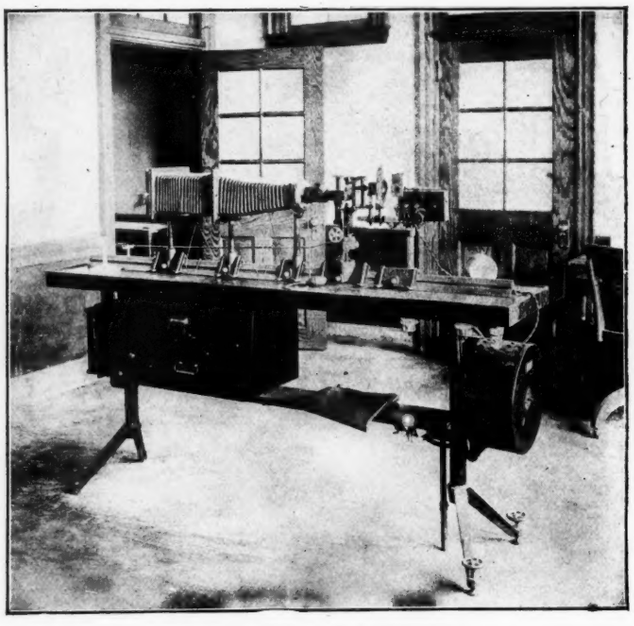
Five universal tension and compression testing machines, one of 1,000,000, two of 300,000, two of 100,000-lb. capacity;

In the machine room, where the sample test specimens are prepared, the following tools are used:

Two 14-in. engine lathes;
One 12-in. drilling lathe;
One 24-in. shaper;
One 24-in. radial drill;
Two milling machines for specimens;
One 30-in. cold saw;
Two motor hack saws;
Two tool grinders.

For the work in testing air brake, signal and tank hose and other miscellaneous tests including steam and hydraulic gages, there are:

Six rubber stretching machines;
One friction test rack for rubber;
One hose mounting machine;



Metalographic Laboratory

One vibrating test rack for hose;
One continuous test rack for rubber;
Four tension testing machines for rubber;
One stretching machine for rubber insulation;
One spring micrometer machine;
One vacuum gage testing machine;
One arbor press specimen cutter;
One hydraulic gage testing machine, capacity 25,000 lb. per sq. in.;

One dead-weight gage testing machine, capacity six gages;
One wiggling testing machine for hose;
One bumping testing machine for gages;
One whipping testing machine for gages;
One hydraulic machine for testing gage glasses.

The materials for test, including samples which have been obtained by the inspectors at outlying points and those sent to the department by the shops, are brought into the building through the receiving room. They are distributed throughout the building from that point, the metal specimens going to the machine room in the basement for preparation, then to the physical laboratory for tension, compression, vibratory or other tests, and to the chemical laboratory for analysis.

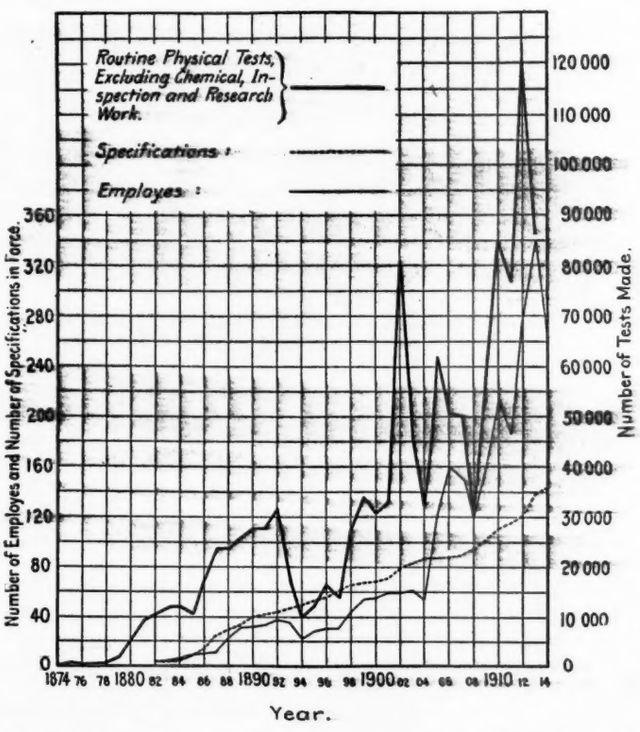


Diagram Showing the Growth of the Department of Inspection and Tests of the Pennsylvania Railroad

Rubber, Air Brake Hose and Miscellaneous Laboratory.—The extent of the work of this department is indicated by the fact that the needs of the railroad are about 635,000 pieces of air brake hose per year. There are now being installed machines for air brake, signal and tank hose, and other miscellaneous tests, including steam and hydraulic gages, and gage glasses for boilers and lubricators.

Heat-Treatment Laboratory.—This department, on the first floor, is for the development of standards in the heat-treatment of metals during the process of their manufacture for use in railway equipment. Investigations are carried out to study the effect of various heat treatments on a large variety of carbon and alloy steels. They are also made to determine the properties of non-ferrous alloys, including the co-efficient of expansion. Shop-manufactured locomotive and car springs, involving as they do a form of heat-treatment, are sampled and tested regularly to determine their acceptability for service.

Large castings of various kinds have been heat-treated by this department with the aid of outside facilities with a gratifying degree of success. The effect of chemistry and heat-treatment upon the endurance of materials to repeated stresses is tested out by revolution and vibration tests, including vibration tests on complete springs. Rails, splice bars and tie plates are heat-treated to study the increased service it is possible to secure. The effects of heat-treatment are noted and a wide range of working conditions are applied on a variety of the high speed tool steels to ascertain the best chemical characteristics.

Investigations are made on various types of fireproof material for the purpose of maintaining a high standard. The testing of felt and insulating papers used for lining refrigerator cars has been made necessary by the large variety of materials of this kind on the market, the keen competition among manufacturers, and the ease with which the highest grade and best material can be closely imitated by cheap and inferior products. This laboratory is equipped with an insulated room and electrical heating arrangements for this work, the tests being designed to represent as nearly as possible the service conditions to which these materials would be subjected. Temperature measurements are made of various types of refrigerator-car construction by means of resistance thermometers. Aside from the measurements of high temperatures in the laboratory, periodic calibrations are made of the various pyrometers. The heat-treatment department in general carries on a large variety of special work, and there is but little that falls without its range of possibilities even to the extent of heat treating glassware.

ELECTRICAL LABORATORY

Lamp Tests.—On the third floor the equipment for lamp tests consists of three photometers, a lamp test rack of 1,000 lamps capacity, with switchboard, transformers and potential regulator equipment. This work was taken up in 1902, with a view of obtaining data for the preparation of specifications to secure uniformity in the ordering of incandescent lamps, and the maintaining of sufficiently high standards. It consists mainly of life tests of lamps at abnormal voltages and tests for the efficiency of illumination, as well as the investigation of new developments in the general field of illumination as applied to railway work.

Standardization of Instruments.—A division of the electrical laboratory is employed in investigations and development work along electrical lines, and the standardization of electrical instruments. Part of this work is done at the laboratory, and part of it, when necessary, at other points, by laboratory men. The character of the work may be judged from the following examples upon which comprehensive reports have been made:

The Water Testing Laboratory

An investigation of electrolysis in systems of underground metallic structures;
Tests and investigations of the construction of various makes of transformers;
Tests of various makes of primary and secondary battery cells;

Oscillographic tests for linear and angular velocity, wave forms, etc.;
Investigations of special cases of electrical troubles;
The development of an electrical method of measuring the hardness and homogeneity of steel.

Matters such as these are reported on and recommendations made. Electrical instruments are sent in from all points on the Pennsylvania system to this department for calibration and repair, and men from the laboratory are sent out to inspect and check electrical instruments on switchboards at the various power plants, and at other points.

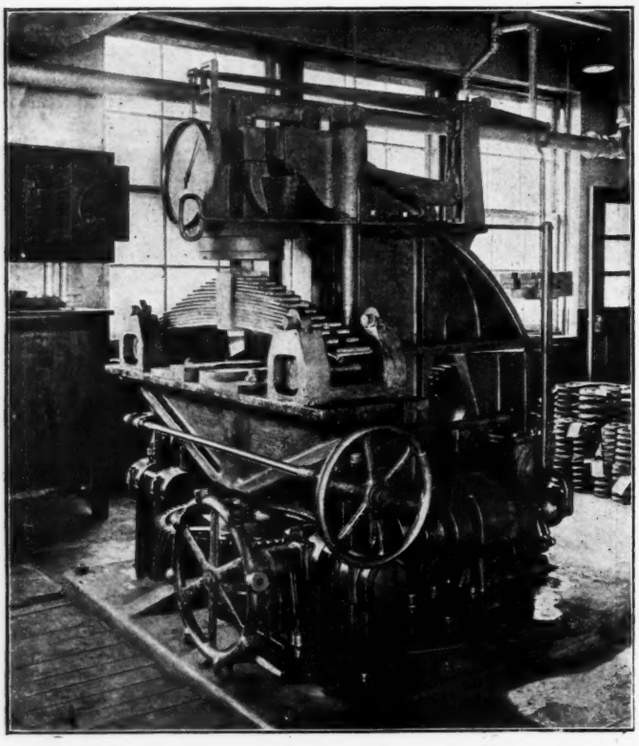
LABORATORY AND ROAD ASSISTANTS

The large room on the second floor is provided for the force of laboratory and road assistants coming under the direction of the foreman of road tests and special tests. The duties of these men are varied, and include tests of locomotives on the road or tests of equipment with special devices; the tonnage rating of trains and the following up of all experimental appliances which are put into service for test purposes.

The fifth floor has been arranged for photographic work, consisting largely in making prints of metal sections, photomicrographs of steel rails forming a large part of these. Photographs of parts which have failed in service are also made for convenient preservation and study. The photographic work requires the services of two men and about 25,000 prints per year are made.

CHEMICAL LABORATORY

Metallurgical Work.—The main chemical laboratory on the fourth floor is divided by the central balance room, into two

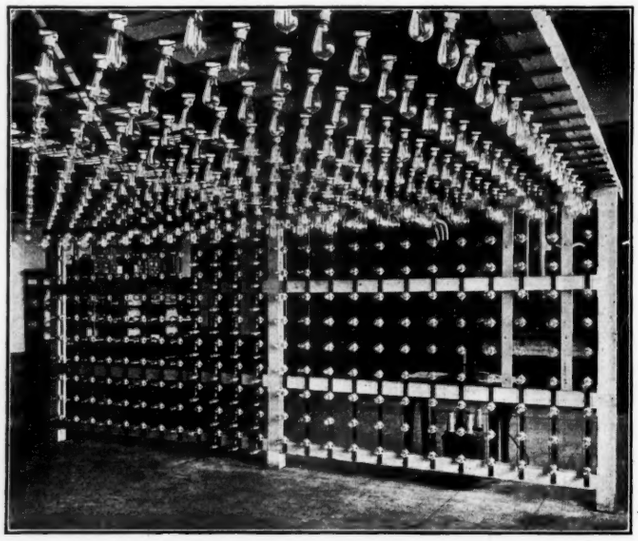


Vibratory Endurance Testing Machine for Springs

departments, the larger one of these being devoted exclusively to metallurgical chemistry. In this department methods are developed for the determination of the elements in plain-carbon steels, alloy steels, and non-ferrous alloys used for bearing backs and linings, packing-ring metal for different purposes, etc. Data are obtained leading to the development of specifications for this class of products, and samples of shipments are analyzed to determine whether they are acceptable under the specifications adopted. This steel laboratory has facilities for analyzing 100,000 samples per year.

Miscellaneous Work.—The smaller of these two laboratories is for work of a more general character, being used for the examination of fuels, the development of specifications for paint products, lubricating and burning oils, boiler compounds, lacquers, plush, car cleaners, cutting compounds, belt dressing, polishing compounds, hydraulic-jack liquids, fuses, track caps, fire-extinguishing preparations, the recovery of used or wasted products, etc.

In both of these laboratories much time has been spent in the examination of broken or "failed" parts of equipment, in an effort to determine the cause and with a view to the preven-



Lamp Test Rack with a Capacity for Making Efficiency and Life Tests of 1000 Lamps

tion of accidents which aside from the money losses, might result in injuries or loss of life.

Certain food products used in the dining car service are also examined here at times; many other miscellaneous investigations are made, as of conditions which may have led to loss from the damage of freight in transit, and to so establish methods for preventing such loss. During the past year a considerable amount of work has been devoted to the chemistry of tunnel air in connection with the installation of ventilating systems. The total list of activities touched upon would be too long for enumeration in an article of this character.

The chemical analysis of rubber compounds has been studied and much experimental work done in perfecting a method whereby material of this kind can be bought on specifications which define and limit its chemical properties. At present there is in force a specification for high-grade rubber insulation. Samples from all shipments are analyzed as well as some other rubber compounds. At the same time experimental work is being carried on to improve the method of analysis, and to devise others so that specifications may be drawn covering the chemical properties of other grades of rubber materials.

Manufacturing Laboratory.—A manufacturing laboratory, which might be called a small factory, is maintained in a separate building which is under the direct supervision of the chief chemist, and new products are manufactured in this until such time as it is found advisable to purchase them from "outside" manufacturers.

Laboratory Car.—In addition to the steel-rail work at Altoona a laboratory car has been built to be moved, as required, to that point where steel rails in process of manufacture are to be inspected. The object in equipping this car is to make chemical analyses of the finished rails at the mills by a force of chemists under the chief chemist. This, it is expected, will avoid delays which at times occur in the operation of the mills, and are im-

possible to avoid without the facility of a suitable force at hand at the time and when the rolling is taking place, in order to keep up with the chemistry requirements of the company's specifications. The car is equipped with furnaces for combustion and all other necessary apparatus for general chemical work in connection with the inspection of steel rails.

Bacteriological Laboratory.—When the department of chemistry was established, problems were frequently presented which applied chemistry could not solve satisfactorily. It was found, for example, that a chemical examination of water might show the presence of organic constituents, but it was impossible to tell the source of these. A water might contain a large amount of organic material of vegetable origin and yet not carry any infectious material which would likely give rise to disease, while other samples low in organic constituents were believed to carry infectious germs which might render their use very dangerous to employees or patrons of the road.

It was also found necessary to supervise certain sanitary matters and to disinfect cars, offices and waiting rooms under certain conditions, but it was not known what disinfectants were destructive to specific disease-producing bacteria. Manufacturing concerns were offering various disinfecting preparations, but the officers of the company had no means of determining which ones were efficient and the problem could not be solved by chemistry alone. These questions were considered so important that it was decided that a division of bacteriological chemistry was necessary, and on November 1, 1899, such a laboratory was established.

The work in bacteriology and water analysis has increased constantly, and at the present time four men are employed in the laboratory. The department co-operates with the surgeon general of the United States in the enforcement of the quarantine regulations of 1913, which require that railroad companies shall furnish wholesome drinking water and proper ice supply to passengers using their cars. Water which contains anything indicative of injurious contamination is not permitted to be introduced into the drinking containers of a Pennsylvania coach.

The department regulates the standardization of disinfectants and issues instructions concerning their application for the protection of passengers and employees, as well as the disinfection of stock cars. Special care is taken to prevent any infected employees from coming in contact with the public.

In 1914 bacteriological and chemical examinations were made of 609 samples of drinking water. There were 3,112 bacteriological examinations of pathological specimens, submitted by the relief association physicians. The total number of bacteriological examinations was 3,621, or an average of more than ten per day.

In addition, this department has under its care the examination of boiler feed waters and the formulation of methods for their treatment. In 1913, examinations of 287 boiler feed waters were made, while in 1914 the number was 282.

OTHER EQUIPMENT

As part of the equipment of the test department there is a dynamometer car which was built in 1906, and is the fifth of a series of such cars which have been in use on the Pennsylvania Railroad. There is also the locomotive testing plant which is located adjacent to the test department building. This plant was erected in 1905, after having been in use at the St. Louis Exposition in 1904, and is operated by a force of 26 men.

There is being installed in a separate building a brake shoe testing machine which will be the first of its kind, in that it will have two dynamometers of 4,000 lb. capacity, which will make it possible to obtain the co-efficient of friction of brake shoes when two shoes are applied to a single wheel (clasp brake conditions). The car wheel will run upon an idler wheel, representing the action of a rail upon the wheel.

EXTENT AND VARIETY OF MATERIALS TESTED

The scope of the work now embraced by these departments coming under the jurisdiction of J. T. Wallis, general superintendent of motive power, at Altoona, can be better appreciated when it is understood that the cost of the materials covered by the inspection and tests, and entering into the construction of the railroad rolling stock and track, in 1913 amounted to $82,119,480, while the cost of operating the test department and chemical laboratory for the same year was $534,060. For an approximation and using these figures, it is interesting to observe that the total cost of operating the departments, including all additional work and inspection, is about 0.6 per cent of the cost.

The year 1913 was perhaps a record one for the test department and laboratory, and the extent and variety of the work of the departments can be shown by a few examples for that year. There were 61,148 separate reports of material tests issued by the test department. In the physical laboratory, while no record was kept of the number of samples examined, 138,886 tests were made. These tests represented quantities such as the following:

Of bar iron 149,863,693 lb. were tested and 6,246,611 lb. rejected; of staybolt iron, 15,385 tests representing 8,301,960 lb. were made; of cement, 29,231 tests were made, representing 587,900 bbl., of which 13,600 bbl. were rejected; of wheels, 310,381 were inspected, and 1,213 were rejected; of axles, 164,810 were tested and 8,035 were rejected; 290 samples, representing 56,322 yd. of plush, were tested; of air brake hose, samples representing 634,807 were tested and 84,826 rejected.

In the chemical laboratory, during 1913, a total of 57,309 samples were analyzed, involving about 286,545 determinations.

There are 85 items, ranging from asphaltum to zinc, which are now bought under specifications and which must be passed upon by the test department or the chemical laboratory.

During 1913 there were inspected, while building at manufacturers' works, 24,966 freight cars, 343 steel passenger cars, and 190 locomotives. The value of the materials rejected through the test department in 1913 was for the physical laboratory, $776,928; and for the chemical laboratory, $65,767.

ORGANIZATION OF DEPARTMENTS

As outlined in the diagram of the organization, the inspection at the manufacturers' works and the collection and forwarding of samples to Altoona is carried out under the direction of the chief inspector, with permanent resident inspectors and forces for the central district at Altoona, the western district at Pittsburgh and the eastern district at Philadelphia. In addition, when equipment is being built at outlying points, temporary inspection forces are maintained at these places during the progress of the work.

As previously stated, the work of the department began under the direction of John W. Cloud. In May, 1879, he was appointed the first engineer of tests and continued under that title until July, 1886, when he succeeded to the office of mechanical engineer, retaining control of the test department. Axel S. Vogt, the present mechanical engineer, succeeded Mr. Cloud in March, 1887. The work of the department under the mechanical engineer was in direct charge of W. O. Dunbar from July, 1886, to July, 1893. From the latter date to July, 1903, the assistant mechanical engineer had direct charge of all the work of the department. During this latter period the assistant mechanical engineers were A. W. Gibbs, from July, 1893, to August, 1902, and W. F. Kiesel, from the latter date until July, 1903. In August, 1903, E. D. Nelson was appointed engineer of tests, and in September, 1911, was succeeded by the writer.

Two men have been in charge of the chemical laboratory, Dr. Charles B. Dudley from November, 1875, until his death, December 10, 1909. Since December, 1909, Dr. F. N. Pease has held the position.

That the information collected and the developments which have been made in the chemical laboratory and the test department have been freely given to the public, is well exemplified by papers and addresses which have been presented by the late Doctor Dudley. In addition to the works of Doctor Dudley, there have been published by the test department, 27 printed bulletins covering field tests and the work of the locomotive testing plant.

TRIES TO USE RAILROADS AS SELLING AGENTS

An example of methods by which shippers may cause a great deal of trouble for railroads is illustrated by an experience which the Erie and other Chicago lines have been having with a small mail order house in Chicago, which apparently has been trying to coerce them into acting as selling agents for its products, and when some of the roads refused, has attempted to boycott them.

Ward & Company, located at 730 North Franklin street, Chicago, who deal in soap and toilet preparations and other articles, have been making a practice of shipping packages of their goods to prospective agents to be sold on a commission basis, the agent to keep half of the sale price and remit the other half to the company. The agents are required to pay the freight charges in both directions, but when they are unable to sell the goods they have often returned them to Ward & Company, without prepayment of the freight charges on the return movement. There have been other cases where the consignee has refused to accept the goods on arrival, leaving them in the hands of the carrier, without recourse of the latter to collect charges in either direction; in one instance at least, shipment was made to a young boy, who had answered the alluring advertisement of the concern.

This company sends to its prospective agents a blank contract form to fill out, in which the agent agrees to dispose of the goods within 30 days, and also to pay freight charges and take them promptly from the freight station. So many of the shipments were returned that the Chicago freight stations were congested with them, and when Ward & Company were notified they advised the railroad that they would accept no shipments on which the freight charges were not prepaid in full by the shipper, and requested the road to notify its agents to that effect. On January 27, 1913, the railroad did issue a circular to all its agents and connections advising them not to accept such shipments unless all freight charges were fully prepaid, but in the large number of circulars handled by the average station agent they were often overlooked and the shipments kept coming in. Also, in many cases the consignees declined to accept the shipments and they were sent to the unclaimed freight depots.

Ward & Company gave instructions to the railroad to sell the shipments for charges and to remit the balance. They usually claimed that the value of the shipments was $10 and authorized the railroad to sell them for $5, but the railroad could not dispose of them for anything above 75 cents. Authority was finally obtained to dispose of the packages at 75 cents each, which was not sufficient in all cases to cover the charges. Finally, notice was served on Ward & Company that commencing February 20, 1915, the railroad would require the prepayment of freight charges on the shipments on the ground that the goods were not worth the freight charges.

This action resulted in the issuance by Ward & Company of various notices not to ship goods over the Erie, which was some relief to the road, although giving it some unpleasant advertising, but the goods continued to be shipped to points which could be reached only by its lines. Red pasters were placed on all packages sent out by Ward & Company containing the notice in large type "Ship no goods to Ward & Company over the Erie Railroad," and postal cards were mailed to agents of the road containing the same notice, with a footnote "Account of Erie Restriction on Ward & Company's Outgoing Shipments." Similar notices were issued applying to the Baltimore & Ohio, Chesapeake & Ohio and Chicago & North Western. The railroad cannot collect the charges from the original consignees, the latter claiming that the goods are the property of Ward & Company, while the Ward company disclaims ownership but claims to have a lien on the property. Ward & Company, in a letter to the Erie, have stated that the matter will be taken up with the Illinois Public Utilities Commission and the Interstate Commerce Commission, and that, if possible, an injunction will be obtained restraining the road from refusing to accept their shipments with charges collect.

WISCONSIN BERTH LAW ANNULLED

The United States Supreme Court has declared unconstitutional the statute of Wisconsin prohibiting the making up of an upper berth in a sleeping car until the berth is engaged. The decision is by Justice Lamar who holds such a regulation unconstitutional as taking private property without compensation. Moreover, the practice interferes with interstate commerce in that it is an inconvenience for a passenger to have the upper berth made up after he has got into the lower one.

The statute was passed in 1911, being designed to take the place of one passed during the year 1907, and found to be unconstitutional. The suit was brought by James T. Hall, against the Chicago, Milwaukee & St. Paul, which runs its own sleeping cars.

On the trial the railroad company insisted that the statute was arbitrary and unreasonable; not designed to accomplish a legitimate public purpose and contrary to natural justice. It claimed that the statute denied to it the equal protection of the laws; took its property without due process of law in violation of the Fourteenth Amendment and attempted to regulate interstate commerce. There was a hearing before the trial court without a jury. Some of the averments in the railroad's answer were admitted to be true. In addition witnesses were sworn whose testimony—admitted over objection—was to the effect that—while the company had a pecuniary interest in having the upper berth kept down when the lower was occupied yet—such lowering was necessary to secure the comfort of the occupant of the lower berth and to prevent him or her from being wakened or disturbed if it became necessary to put down the upper berth and arrange it so that it could be occupied by a passenger who had purchased such upper space during the night. The evidence was to the effect that the opening of the curtains, the glare of the light, the noise of the lowering the berth, the work of arranging the bedding for the upper berth and securing the holding wires would necessarily inconvenience the man or woman occupying the lower berth; deprive him or her of the privacy to which they were entitled and interrupt the rest and sleep to secure which they had engaged the berth.

There was evidence, and contention based on common knowledge, that the letting down of the upper berth did not affect the health or convenience of the occupants of the car or of either berth. This was demonstrated by the absence of injurious effects and the fact that lower berths with the upper berths down had thus been constantly used by travelers since sleeping cars were invented. . . . And if it was harmful to let down the uppers it would be even more harmful to permit additional passengers to come into the car and occupy them.

The decision declares that the objection to the act of 1907, which was annulled by the Supreme Court of the state, has not been overcome by the language of the act of 1911. The state could not authorize the occupant of the lower berth to take salable space without pay, neither can it compel the company to give that occupant the free use of that space pending actual purchase by another passenger. The owner's right to property is protected even when it is not actually in use, and the company cannot be compelled to permit a third person to have the free use of such property pending the appearance of a buyer. The statute cannot be sustained as a health measure. The right of the state to regulate public carriers in the interest of the public is very great, but that great power does not warrant an unreasonable interference with the right of management.

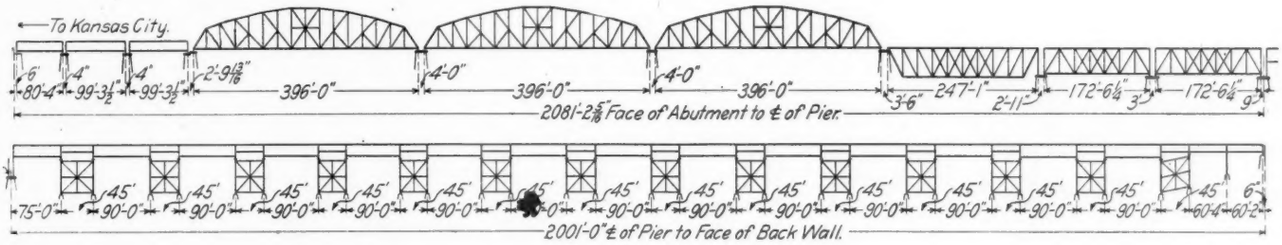
Counsel for the state argued that the statute should be sustained as an exercise of the state's reserved power to alter the charter of the company; but this view is rejected; the right to amend a charter does not authorize the taking of the property without just compensation. The power of amendment is not without limit.

Justices McKenna and Holmes dissented; but delivered no written opinions.

New Bridge Across the Missouri River at Sibley, Mo.

The Santa Fe is Completing the Renewal of a 4,100 ft. Structure With a Ballasted Deck Under Traffic

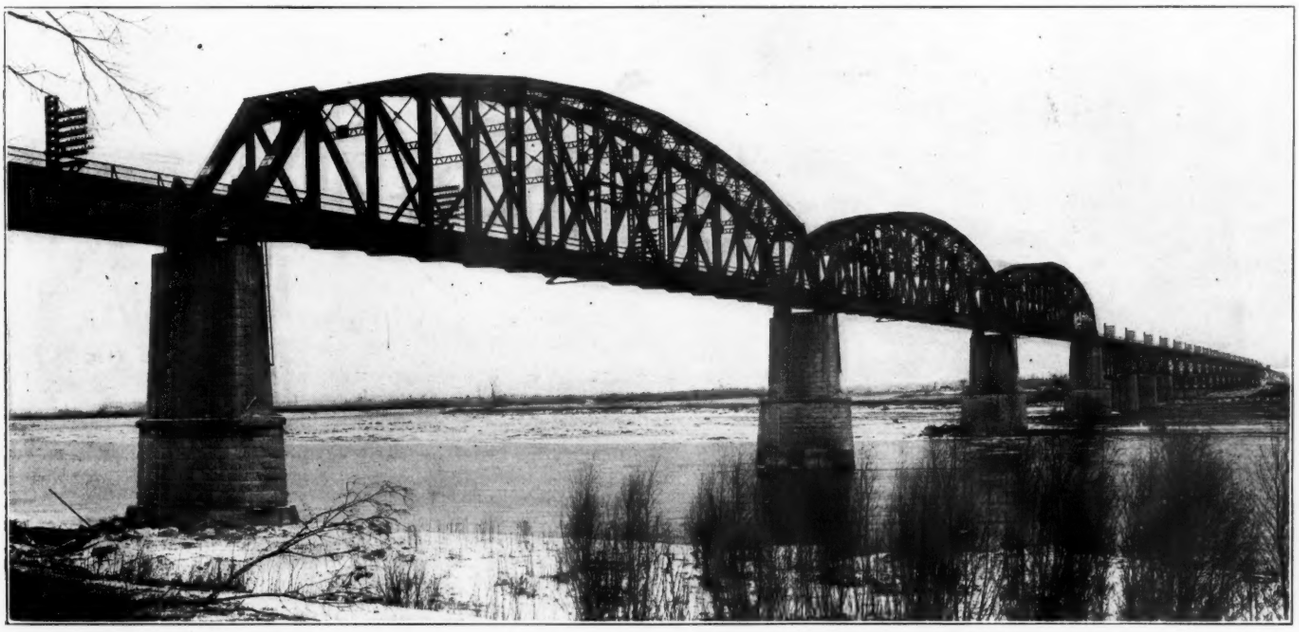
The Atchison, Topeka & Santa Fe is now completing a new bridge across the Missouri river at Sibley, Mo., on its main line about 25 miles east of Kansas City, which is of interest on account of its size, the advanced design adopted including the use of a creosoted ballasted deck, and the fact that the replacement of the old structure with the new was carried on without interference with a relatively heavy traffic. This problem was further complicated by the raising of the viaduct at the east end a maximum of 7 ft. to reduce the approach grade from 0.8 per cent to 0.5 per cent. Approximately 9,600 tons of steel were required and the total expenditure was about $1,300,000.



Elevation of Santa Fe Bridge Across the Missouri River at Sibley, Mo.

The old bridge was built in 1887 at the time the line was extended to Chicago. Beginning at the west end it consisted of one 80-ft. deck girder span, one 200-ft. deck truss span, three through-truss spans 396 ft. long, one 247-ft. deck truss span, two 172-ft. 6-in. deck truss spans and 2,000 ft. of steel viaduct composed of 30-ft. tower and 60-ft. intermediate spans, making a total length of 4,082 ft. between parapets. This was a single-track bridge designed for a loading approximately equal to Cooper's E-24, and had become too light for the engines and trains operated over this line. Faulty details in the lateral system of the long spans, in the longitudinal bracing system in the viaduct towers and in the ends of the columns, made its reconstruction imperative. For two years preceding its renewal large engines were not allowed to work steam when crossing the long spans and a pusher was attached on the approaches to the bridge.

The old crossing was at right angles to the stream and tangent for its entire length, with a 6-deg. curve on the bank at each end. The west approach required practically no embankment as the line is supported on the high bank which rises abruptly from the river. The east approach ascended from the adjoining low flood plain on a fill nearly two miles long and 60 ft. high at the bridge. When the renewal of this structure was first considered it was proposed to build the new bridge on another location closely approximating an extension of the east approach tangent. This would have eliminated the two 6-deg. curves and a small amount of distance, while it would have enabled the new bridge to be built without any conflict with traffic. It would however, have resulted in the abandonment of the present substructure and have required a very considerable extension to the approach fill on the east end. It was therefore decided to rebuild on the present alinement.



The New Santa Fe Bridge across the Missouri River at Sibley, Mo.

Approaching the old structure from the east was an 0.8 per cent grade, extending across the long approach fill and the viaduct to the truss spans. The grade was level across the seven

truss spans and then ascended on the west bank on a 0.3 per cent grade. When originally built, the ruling grade on the Missouri division was established at 0.8 per cent. Recent improvement and second-track work has gradually reduced this to 0.5 per cent, except at one or two points. In considering the reconstruction of this bridge it was therefore decided to reduce the grade on the east approach to the new standard, which necessitated a maximum change in elevation of the viaduct of 6.9 ft. at the east end and a maximum raise in grade on the approach fill of 22 ft. The river spans provide a clearance of 50 ft. above the high water elevation of 1903. The maximum variation between high and low water elevation at this point is 37 ft.

The new structure is being built for a gauntlet track. As this is the only stretch of single track between Chicago and Kansas City, the advisability of building a double-track structure received very careful consideration. However, it was finally decided that as there is double track up to both ends of the bridge, a gauntleted single-track structure would provide sufficient capacity for any increase in traffic which might be expected during the normal life of the new structure, and that when it again required renewal, the traffic might justify a double-track structure on the proposed new alinement. The construction of the gauntleted bridge on the existing alinement and including the reduction of the grade on the east approach showed a saving of over $500,000 in comparison with a double-track structure on the new location.

In the new bridge the 200-ft. deck truss span near the west end is replaced by two 100-ft. deck girder spans, resting on a new center pier. All other spans are replaced with others of the same length. The steel viaduct at the east end consists of 45-ft. tower and 90-ft. intermediate spans.

THE MAIN SPANS

While in general the old masonry was still in good condition, it was necessary to repair and remodel it in several places. The west abutment was enlarged and wing and parapet walls added. The west pier was raised to support the new girder spans. A new pier was also necessary to support the two 100-ft. girder spans which replaced the 200-ft. truss, while the change in grade at the east end of the viaduct and the increase in length also made necessary the reconstruction of the east abutment.

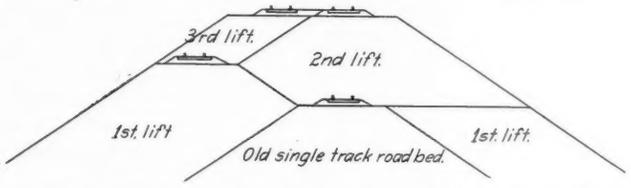
With the exception of the pier under the east end of the east deck truss span, which is supported on oak piles driven to rock, and that under the west end of the west truss span, which rests directly on a rock ledge a short distance below low water, all the piers under the truss spans are carried on pneumatic caissons founded on rock. The four piers under the main channel spans are faced with granite to the elevation at which the ice usually goes out. The remainder of the material is Strong City (Kan.) sandstone. While these piers were of ample dimensions for the new structure, the stone in the upper courses of four of them had become frost-broken, so that it was necessary to replace this with concrete for a distance of 12 to 20 ft. from the top. To accomplish this it was necessary to support the spans independently of the tops of the piers during their reconstruction. Two cofferdams were sunk onto the top of the pneumatic caisson on each side of each of these four piers. Concrete buttresses were then built in each of these cofferdams, supported on the caissons and extending up to average high water level. The buttresses on opposite sides of the pier were anchored together with 1½-in. rods extending through the pier. The concrete was placed by floating equipment. Steel bents were then erected on these buttresses and the load transferred from the masonry to these steel columns, after which the faulty

Views Showing (left) The Bottom Lateral System and (right) The West Portal

masonry was removed and the concrete placed. In the accompanying photographs of the reconstructed piers it will be noted that there is no projecting coping at the top, a standard practice on this road for concrete masonry.

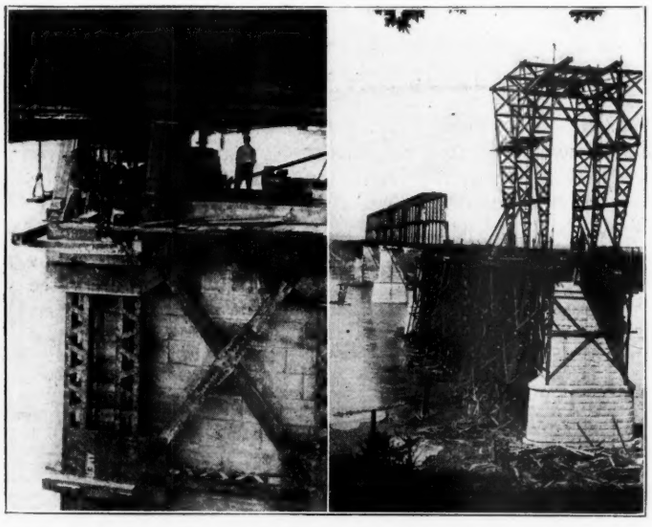
The remodeling of these piers and the placing of the concrete was done during the winter, much of it when the temperature was below zero. To prevent injury to the concrete in these exposed places the materials were heated before mixing and the green concrete was covered with tarpaulins, inside of which live steam was circulated.

This bridge is designed for Cooper's E-60 loading without modification. It follows the railway company's general stand-



Various Steps in the Construction of the East Approach Fill

ards of design except in a few instances. No adjustable members are placed in any of the large spans. To secure the desired strength and rigidity the various sections were designed liberally. To give an idea of the size of some of the more important members, the end post and top chord sections include three 40-in. web plates and 48-in. cover plates. In these sections no plates thicker than ¾ in. were used. The heavy design is especially noticeable in the bottom lateral system, which weighs 1,200 lb. per lin. ft. and in the top lateral system weighing 800 lb. per lin. ft. No curved members are employed, even at the portals, but care was taken in the design to use plain members



Transferring the Span from the Masonry to the Steel Post **Renewing the Floor on the First Long Span**

throughout to secure a minimum cost of fabrication without sacrifice of serviceability or appearance.

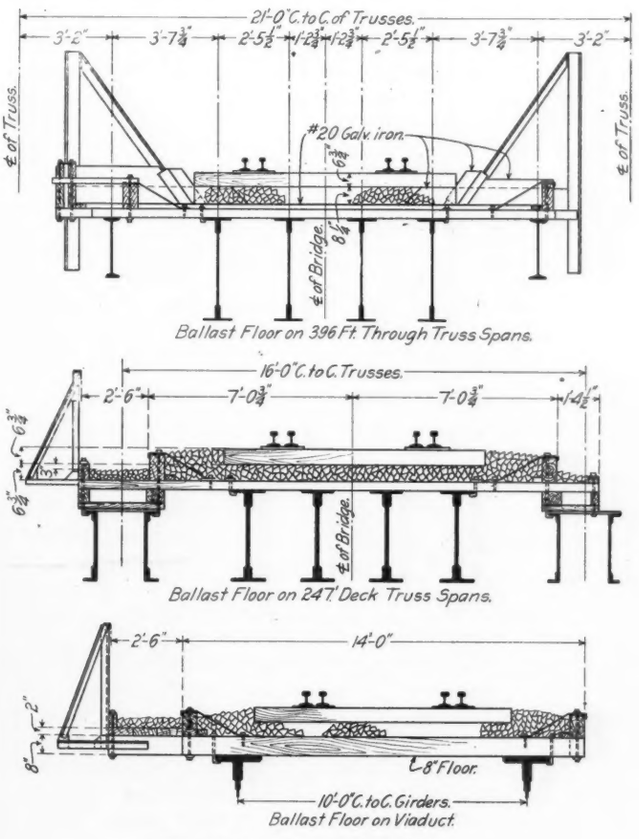
To provide a horizontal seat without vertical offsets at pier 6, the east end of the 247-ft. deck truss span is carried on a vertical steel bent on a rocker bearing. A similar arrangement is provided at pier 8, where the first girder span of the viaduct is also supported on steel posts.

In replacing the long spans, they were first transferred to falsework, one at a time, and dismantled by a traveler in the usual manner. The floors were then changed out and the new spans erected. Especially when changing out the floor, the necessity of avoiding interference with traffic was a serious problem.

The government refused to permit the three long spans to be erected continuously across the stream, but required the west span to be erected first, the east long span next and then the middle span. This made it necessary to move the 150-ton traveler across the old center span. This was accomplished by laying stringers on the top chord of the span and placing rails on them. All movable equipment was removed from the traveler to lighten it, after which wheels were put under it and it was pulled across the center span by means of cables attached to a hoisting drum. While the removal and replacing of the equipment required considerable time, and this requirement of the government entailed an additional expense of $1,500, the time actually consumed in moving the traveler across the span was less than 30 minutes.

THE VIADUCT

In designing the viaduct the principal problem arose from the necessity of adopting span lengths such that the new piers would



Typical Sections of Ballast Floor

miss the old ones in all cases, as the masonry in the old pedestals was faulty and could not be used. With a careful adjustment of span lengths it was possible to design the new viaduct so that no new pier came within 12 ft. of an old one, measured between centers. Because of the difference in depth, the 45-ft. tower girder spans are supported on shelf projections on the ends of the intermediate spans, and all loads are transferred to the steel posts through the longer girders. One end of each long span is carried on expansion bearings consisting of four 12-in. segmental rockers. The towers are built to a batter of 2½ in. to 1 ft. and are heavily latticed.

The viaduct is supported on massive concrete pedestals carried on from 12 to 16 concrete piles each. They were cast at the site and were designed to carry 20 tons each. They were driven until 60 blows were required to sink them one inch. The pedestals are connected with a thin reinforced concrete wall extending from just below the ground line to the top of the piers, this wall being built monolithic with the pedestals. After

the erection of the steel towers the bottoms of the posts were filled with concrete to protect the connections from moisture.

As it was necessary to erect this viaduct under traffic the track had to be raised to the new grade before placing any of the new steel. This required raising the deck of the old structure vertically a distance ranging from nothing at the connection with the main spans at the west end to 6.9 ft. at the east end. This was accomplished by lifting the girders at one end of each span one foot at a time with a derrick and blocking under it on the top of the tower. This process was continued from span to span until the track over the entire viaduct was at the required grade when the new viaduct was erected and the load transferred to it.

OTHER FEATURES

One of the special features of this structure is the use of a creosoted ballasted floor throughout the entire length. While this form of construction has come into quite general use on short spans, its application to truss spans 396 ft. long is unusual. However, careful records of the cost of maintenance of other structures, equipped with this type of floor on the Santa Fe, showed that it was economical, even on these long spans, because of the decreased cost of track maintenance. It was on this consideration that it was adopted here. Four-inch by 8-in. creosoted timbers are laid solidly on 24-in. 85-lb. I-beam jack stringers between vertical curbs spaced 13 ft. 11 in. between faces and allowing 8¼ in. of ballast below the 6¾-in. by 9-in. by 9-ft. ties at the end of the spans and a minimum of 6 in. at the center with the span carrying the full dead load. No attempt is made to build this floor waterproof.

Although gravel ballast is shown in the accompanying photographs, this will be replaced with stone in the near future, as the hauling of dirt across the bridge for the east approach fill is now almost completed. New ties and 90-lb. rails will also be laid and the gauntlet track added at that time. The track will be laid with screw spikes and special tie plates and rail anchors. No. 20 frogs will be employed at the ends of the gauntlet. The creosoted floor provides for a sidewalk and hand rail across the entire structure. Telegraph brackets are attached on the downstream side, especially designed to afford ready access for the linemen.

The east approach fill is 10,000 ft. long and 65 ft. high at the highest point. In addition to being widened for double track it was raised a maximum distance of 22 ft. to conform to the new grade. This required placing 1,750,000 cu. yd. of material, all of which was secured from a cut about 3 miles west of the fill and across the bridge. This was loaded by two 95-ton Bucyrus shovels into 20-yd. Western air dump cars hauled by road locomotives. In spite of the necessity of avoiding interference with main line trains, as much as 5,400 cu. yd. of material was brought to the fill and unloaded in 9 hours. The accompanying sketch shows the manner in which the fill was widened and raised in three lifts.

The material was largely clay, which slid badly when saturated. After several slides had taken place about 80 large rock drains were built into the bank with outlets below the toe of slope in a quicksand bed. These drains were spaced as closely as 50 ft. apart in some instances where conditions were especially bad. After their completion a berm was built along the outer slope, since which there has been no further movement.

A new station with a 16-lever interlocking machine has been built at Sibley, near the west end of the bridge, to control the operation of the gauntlet tracks. Home and distant signals are provided at each end.

This work has all been handled without interference with the regular traffic, which amounted to an average of about 8 passenger and an equal number of freight trains during the 10-hour working day. When renewing the floor on the truss spans and when placing the 90-ft. girder spans on the viaduct, two passenger trains were detoured over another line to give a longer continuous working period. With this exception all trains were handled over this bridge during the entire progress of the work. This added materially to the complexity of the problem as indicated by the fact that the gang placing the creosoted ballast floor was frequently only able to get in 3 hours actual work in a day.

This work was started in September, 1911. The premature moving of the ice took out the falsework under the west long span in February, 1912, without, however, damaging the structure. As soon as possible it was replaced and the erection of steel started in July, 1912. The three long spans were completed in January, 1913. Ice again took out the falsework under the west 175-ft. span in April, 1913. This was replaced and the deck truss spans were completed in June, 1913. Work on the viaduct was then postponed for some time until the east approach fill was raised sufficiently to enable the track on the viaduct to be raised to its permanent grade. Work was then carried on simultaneously on the fill and the viaduct until March 1914, when the steel work was completed. The construction of the fill is now practically completed, and it is expected that the final track construction will be installed by July.

This work has all been handled under the direction of C. F. W. Felt, chief engineer, and A. F. Robinson, bridge engineer system, with G. J. Bell, division engineer, and F. H. Frailey, assistant engineer, in charge on the ground. The steel was fabricated by the American Bridge Company at the Gary plant. The Missouri Valley Bridge & Iron Company, Leavenworth, Kan., erected all the steel except for the viaduct, and did all concrete work except building the east abutment. The viaduct was erected by company forces, who also built the east abutment and placed the ballast deck on the entire structure.

THE TRAIN DESPATCHERS' CONVENTION

The 28th annual convention of the Train Despatchers' Association of America was held at St. Paul, Minn., beginning Wednesday, June 15, President Charles A. O'Connor (B. & A.) in the chair. George T. Slade, vice-president of the Northern Pacific, welcomed the convention on behalf of the railways of the Twin Cities, and J. E. Scott, chairman of the train rules committee, responded. The president, in his annual address, reviewed the work of the year, congratulated the association on having reduced its deficit of last year by $140, although the expenses of the official organ had exceeded its income by over $500, and urged that some measure be taken to reduce this burden. He also recommended that the president's term be two years instead of one. There were thirty-seven applications for memberships and six for reinstatement, all favorably acted upon.

Charles F. Banks, former officer in charge of efficiency on the Northern Pacific, made an address on "Safety First," describing methods and their results on that road.

The report of the executive committee showed receipts for the year to be $3,297. It was recommended that members be requested to pay for the "Bulletin" a club rate of 25 cents a year, and that the practice of issuing a free copy to each member be abandoned. This would make possible the publication of advertising matter, which, with some effort on the part of members to increase its circulation, would result in making the "Bulletin" self-sustaining. This plan was approved by the convention. The membership account showed that at the end of last fiscal year there were 1,151 members on the roll, to which were added during the year by election and reinstatement, less members deceased, withdrawn and lapsed 88, leaving the present membership at 1,239. Adding members elected at the convention, the membership of the association now stands at 1,282.

The train rules committee, which is joint with that of the American Association of Railway Superintendents, announced that the committee had no report to submit this year, the report of a year ago being incomplete and requiring still further revision. The committee had been in session for the two

previous days discussing certain questions as to which no satisfactory conclusions had been reached, and desired the views of the members of the convention thereupon. On these questions, relating to various phases of train rules, there was an informal discussion which continued until adjournment for the day.

On Wednesday, the second day, the members listened to the "Wonder-Phone," a loud speaking telephone, capable of delivering speech in a loud, clear, articulate manner to individuals or large audiences, and with a soft pedal which can reduce the sound to any extent. The convention was greatly interested in this.

Train rules were again discussed, nearly all day, being interrupted only by an address of half an hour by M. H. Clapp, superintendent of telegraph of the Northern Pacific, on the construction and maintenance of the telephone as a medium for train despatching. Mr. Clapp urged despatchers to more fully inform themselves as to details of telephone maintenance; many despatchers seem to take only a superficial interest. The train rules discussion covered the consideration of Rules 9, 20, 22, 37, 93, 202, 208, 210, 211, 218, 220, 221, 223, and Forms B, C, E, F, G, H and K of the Standard code. The discussion was concluded in the session of Thursday night. The convention affirmed by unanimous vote its opinion that Example 3 of Form G, or some similar example of Form C, giving right or "superiority" of one extra over another, was necessary to efficient single-track train despatching, and approved the Form C examples governing such movement framed by the train rules committee as being safe and effective; also approving the use of the middle order when practicable. There was some discussion as to the word "afterward" in the explanation to Example 4 of Form H, some roads having authorized the combination of this with Examples 1, 2 and 3, when the necessity for protection against certain extras already on the road was apparent at the time of issue of Example 1, while others required, under such circumstances, the issue of Example 4 separately, under a higher number, although delivered with the Example 1 order. The subject was referred back to the committee. There was also considerable discussion as to the practicability of relieving scheduled extras from the restrictions of Rule 93 in the numerous so-called yards where no yard engines are employed. The consensus of opinion was against such action.

The election of officers resulted in the choice of E. W. Weston, chief despatcher, Northern Pacific, Livingston, Montana, as president; Frank I. Felter, chief despatcher, Electric Division New York Central, as vice-president, and of John Colclough, despatcher, Intercolonial, Riviere du Loup, Quebec, as member of the executive committee for four years. Toronto, Ontario, received the almost unanimous vote of the convention as the next place of meeting, and June 20, 1916, is the date.

The third day, Friday, was devoted to the reading and discussion of three papers. One on Checking Train Orders, by C. C. Barnard (St. Joseph & Grand Island); one on Team Work between train despatchers, the yard, the engine house, the train crew and the operators in reducing over-time, by J. P. Finan (A. T. & S. F.), and one entitled The Curve Line of Horse Sense, by F. A. Parker (C. R. I. & P.).

Mr. Barnard presented a table for the year ending December, 1914, showing the number of errors found in each month by inspection of train orders and clearance cards. Out of 18,815 train orders issued in the twelve months the total number of errors found was 266 or 1.41 per cent of the number of orders. The number of errors in clearance cards was 163. The most numerous errors were the use of unauthorized abbreviations; the scratching out of words and the substitution of others; the use of misspelled words and illegible writing, the use of poor carbons and the use of Ex for extra. The number of errors found in the month of January was 100; in February 78; in March 47, and so on down to the end of the year, when the total number was only 11. Notes concerning errors are entered in the personal records of the men making them, and the records may at any time be useful as evidence that proper effort has been made to secure the best service.

The attendance at the convention was very good, there being 201 train despatchers registered, besides ladies and visitors; and it was declared the best convention the association has held since 1892. The whole five days were filled with entertainments for the ladies, a part of the excursions being participated in also by the men.

RAIL SPECIFICATIONS*

By A. W. Gibbs
Chief Mechanical Engineer, Pennsylvania Railroad

In this country we are using heavier concentrated loads than are carried elsewhere. Much has been written to show the relative increases of the weights of rail and of loads carried, and conclusions have been drawn that one or the other has unduly increased. The variables in the conditions of service are very great and very perplexing. The climatic conditions are directly reflected in the monthly record of failures of all kinds, and a spell of unusually severe winter weather is immediately marked by a sudden increase in the number of failures. On the other hand, a succession of mild winters may show such a comparative immunity from failures as to delude us into the belief that at last we are making definite progress. The number of rails which fail annually, as compared with the total number in service, is very small when reduced to percentages. In many materials it could be ignored as purely an economic loss, and not very large at that. It is because the rail is part of a chain that its occasional failure assumes such importance.

With the above points in mind, it must be said that the available data do not show that progress in performance which we have a right to expect. That the real answer to this great problem has not been reached is proved by the continued unrest in our specifications, and by the everlasting changes in sections.

What answer can we make? First, as users, we can and should lessen as far as possible unnecessary punishment of the rail by improvements in the mechanical design and maintenance of our equipment. We can be expected to improve our structure under the rail as our loads increase, and this change is in progress. It is but fair to say that bad conditions, both as to equipment and track structure, have contributed to rail failures. That the large number has attracted no more attention is because of the vigilance of the track inspection. In the very great majority of cases the rails are removed before any serious results ensue.

Against these unsatisfactory conditions we have several possible solutions: Better steel, in the sense of more uniform steel; better steel in connection with more rational sections; materially heavier sections; or retrogression in loads and speeds. To date, a combination of the first and second has been chosen. There has been a very general change to open-hearth steel, at an increased cost.

Neither the American Society for Testing Materials nor the American Railway Engineering Association specification really protects the buyer as to chemistry. Neither puts any limit on the amount of segregation permitted, and it is well known that this ranges over wider limits than would be permitted in the ladle analysis.

In investigating the causes of the failures of individual rails, many analyses have shown such startling discrepancies between the composition of the failed rail and the analysis purporting to represent the heat that it was difficult to believe that they could represent the same material. Either the ladle analysis is an unreliable index of the quality of the

*Abstract of the presidential address delivered before the American Society of Testing Materials, which met at Atlantic City, June 22-25. The complete report of the convention will be covered in these columns next week. The election of officers, etc., is mentioned in the General News Section of this issue.

material in the rail or there is a great need for chemical reform. We know by experience that when put to it the chemists of the producers and the consumers can tally within very reasonable limits. This is a serious matter for the consumer. How far the difference between chemists is due to difference in methods I do not know, but possibly the methods by which the chemistry is determined may have to be agreed upon and made a part of our specifications. Dr. C. B. Dudley, who did much work on standardizing methods of chemical analysis, would in his specifications not only state the composition required, but also the methods by which the determination was to be made.

From the physical standpoint both specifications are defective, as both contain the provision that if the test piece meets the requirements the material will be accepted; but in the event of the failure of the first test piece, two more tests are made, and if both pass, the material is accepted. We hold that this is a pernicious practice, in that the consumer has positive proof that some of the accepted material does not meet the requirements. The American Society for Testing Materials specification includes all the machinery for detecting physically unsound material by nicking and breaking, and then provides that the rails represented by these unsound test pieces shall be accepted as "Special" rails. Presumably they are to be used in some unimportant location. This is another very bad practice. It is not always possible to find unimportant places.

Summed up, the rail specification of the society does not put a proper premium on the selection of the better part of the ingot for one of the most exacting services for which steel is used. Where our specification differs from that of the American Railway Engineering Association it is not so good.

The rail committee is composed of able men. Among them are some of the ablest metallurgists in the country, and we should look to them for that constructive work which would make our specification beyond criticism. The purpose of the society is to make specifications and have them used. If year after year we retain provisions that lessen the incentive to improve the product, we cannot wonder if other specifications are preferred.

If we consider all the steps in our rail industry, we find very few improvements in methods other than those which lend themselves to increased output or reduced cost. There are some notable exceptions to this, three in particular; namely, the electric furnace, for producing steel; the sinkhead process for casting ingots, for producing better ingots; and the deseaming process, for producing better rails, by mechanically removing some surface defects which would later develop into seams. All of these processes are represented by rails actually in track under observation, but it is yet too soon to justify an opinion as to their value, nor have any of these methods been generally adopted.

It is to be hoped that some of the large-scale experiments now in progress will show what is to be looked for from a more uniform product. One of these includes the requirement that the chemistry shall be from the rail, instead of from the ladle test ingot, and the segregation must be within reasonable limits. This experiment will, at least, give a quantity of fairly uniform material, so far as any practical method of representative testing will insure it.

Aside from these, and some experiments on too small a scale to deserve special notice, the rail situation remains very much as it was seven or eight years ago. Any deviation from the beaten path is immediately met by an increase in the price asked, the reasonableness of which the purchaser has no means of determining. In at least one case of which I have knowledge, the actual expense of every kind, so far as it could be ascertained, due to rail breakage on a certain system was less than one-fifth of the annual increase in the cost of rail due to the introduction of a proposed new specification designed to secure the quality of rail desired. The year taken was not an abnormal one in any way. One serious wreck would, however, entirely have changed this showing. It requires a lot of courage and a strong sense of duty to justify such an expenditure when the direct return is problematical.

There are many who believe that we cannot hope for relief by the use of more uniform steel. They make the point that, if this is the solution, it can be obtained by a discard larger than the ordinary. They cite the records of the carriers to show that the failures, especially the breakages, are fairly well distributed throughout the ingot, so that no practicable discard would eliminate the trouble. They also call attention to the many examinations of broken rail which reveal no defect that we can recognize as such. From these conditions they argue that the only remedy is to use more steel—that is, heavier sections—without any change in the specifications as to quality. Possibly this is correct, but we would call attention to the fact that post mortems on rail sometimes give negative results, because we have not before us all the related evidence. The rail may have been damaged by unfair usage, of which there is no evidence. If due to defective support, the evidence is lost when the track is repaired. Damage from defective wheels, etc., leaves no permanent mark. There is a growing belief that the straightening press, by straining the material beyond the elastic limit, is responsible for many otherwise unexplainable failures, and it would also explain why rails from the lower part of the ingot figure so prominently in the breakage record.

As to the quality, we cannot ignore the fact of the difference between rails from different mills. There have been some notoriously bad rollings, as shown by the records of various roads, and these mills have subsequently turned out an excellent product. If all of the rail was as good as the best, we would have very little room for complaint.

The present line of progress includes a general increase in the weight of sections throughout the country. The 100-lb. mark, or that neighborhood, seems to be one of the halting spots, but some sections go considerably beyond this figure. A careful study has been made of the sections, and the new ones, especially of the heavier weights, are believed to be better adapted to secure good mill results, as well as better performance in the track.

Personally, I believe that the time has arrived for a considerable increase in the weight of sections, and I am not so certain that a change of quality is required at the same time. One reason that appeals is the presence within recent years of that class of failures known as "transverse fissures." So far there seems to be no satisfactory explanation. It seems surprising, if this class of breakage develops in the rail, that it should not also do so in the tire, which is subject to the same intensity of pressure. The tire, however, has an immensely greater section than the head of the rail. If the mere fact of the relatively large area of section of the tire contributes immunity from this class of failure, it is fair to assume that somewhat the same result could be looked for in the case of the rail head.

Certain practices, such as the present system of straightening, have long called for improvement. Nearly all rail passes through the gagging press. The rail specifications are possibly too exacting in requiring that all rails shall be "smooth, straight in line and surface, and without any twists, waves, or kinks." It is a question whether this is not asking too much for the good of the rail and whether it would not be well to make the greatest possible tolerance in the way of accepting rail with such variations from straightness as can be reasonably eliminated in laying.

In the search for a remedy for our troubles, some have proposed to improve the product by more or less radical changes in the mill practice. It must be remembered, however, that a modern steel mill, like the railroad, can only

exist by being operated on a large scale. It is designed in advance with a view to a certain sequence of operations, and if proper provision has been made for each, smooth operation follows. The mill, however, is only balanced when it performs these operations in the prearranged order, and to make a radical change—as, for instance, slow rolling, cold rolling, more passes, or one of the many other innovations suggested—may seriously unbalance the whole operation. It is not to be expected that a mill will be willing to make changes in its practice until after experimental work has demonstrated that the proposed practice is practicable and valuable. In conclusion, I must repeat that the rail situation, as we see it, is disappointing. To add to the complexity of the situation, the government, through some of its bureaus, is taking a hand and investigating every serious failure, apportioning blame and suggesting remedies. This will probably increase rather than diminish, and may some day be very awkward for the producer as well as for the user.

RAILWAY TELEGRAPH SUPERINTENDENTS

The 34th annual convention of the Association of Railway Telegraph Superintendents was held at Rochester, N. Y., June 22, 23 and 24, Acting President E. C. Keenan (N. Y. C.) in the chair. There was an attendance of about 200, including wives, daughters and friends. At the first session, largely social, Belvidere Brooks, vice-president of the Western Union Telegraph Company, made a short address. The Western Union takes much interest in these conventions. They promote the adjustment of relations between the telegraph company and the railroads. He reminded his hearers that Rochester was the birthplace of the Western Union Company.

Acting President Keenan stated that the past year had been a prosperous one for the association. Messrs. W. H. Potter and M. H. Clapp, chairmen of the Eastern and Western Divisions of the association, respectively, reported on the meetings of the two divisions during the year. The chairmen of the various committees also made their reports.

The first paper was on "Interference from Single-Phase High-Tension Power Lines on the New York, New Haven & Hartford," by N. E. Smith, of that road. He gave a history of the work of electrifying that road west of New Haven and the difficulties experienced with induction on telegraph and telephone lines. The methods experimented with to overcome these troubles were gone into in detail. The paper contains a fund of information on this difficult subject. In the discussion of the paper I. C. Forshie, of the Pennsylvania Railroad, described the work of electrifying the section of that road between Philadelphia and Paoli, 20 miles, including the sixteen tracks at the Broad Street terminal. All wires throughout the section are being put underground. The telephone and telegraph conductors are in two cables, one of which is called the trunk cable, carrying the through circuits. With the long distance telephone wires phantom circuits are operated and these are composited and duplexed. The Philadelphia-Pittsburgh phantom, 350 miles long, has four telegraph circuits which are operated duplex. He described experiments made during the electrification development to determine what effect would be produced by the different trolley currents. High insulation of the telephone and telegraph circuits and perfect balance both for resistance and capacity are necessary to insure satisfactory operation in the electrified district. The lead sheath of the cables, he said, has taken care of electrostatic induction, but it has no appreciable effect upon electromagnetic induction.

The next paper read was on "Primary Battery for Transmission on Train Despatching and Other Telephone Lines" by G. W. Nelson and E. E. Hudson. This paper dealt principally with the use of low internal resistance, closed-circuit primary cells as a reliable and efficient source of energy for telephone train despatching, arguing that the reliability insured by this source of current is more important than low cost of operation; though a substantial saving in maintenance was also claimed.

In the discussion W. E. Harkness pointed out the advantages and disadvantages of the caustic type of cell. While the caustic soda cell is superior to the dry cell for despatchers' transmitters, it is a question if it can show any advantage over storage cells in this service. For way-station transmitters the caustic soda battery, when properly maintained, has given satisfactory service. It would not, however, furnish a uniform or high grade of service when subjected to heavy or long periods of discharge. Under ordinary conditions storage cells cannot compete with either the caustic soda cell or the dry cell in way-station service. He favored the use of the caustic soda cell for booth and other outdoor telephones. The soda cell is superior to the dry cell, he said, as a common source of current. He thought caustic soda cells could be used with advantage for the operation of telegraph sounders.

R. F. Finley (N. Y. C.) read a report, giving results of tests of wet and dry batteries on that company's lines, with comparative costs.

At Wednesday's session the first paper was by M. H. Clapp (Northern Pacific). He reviewed the development and the growth of the use of the telephone in railroad service. The Northern Pacific has made extensive use of telegraph wires for telephones in a variety of combinations, and has extensive plans for further utilization of existing facilities for operating by the latest methods. When pole lines are rebuilt all wires are transposed, anticipating future needs. Railroads should establish more private telephone exchanges. The loud-speaking telephone is now an assured success.

G. A. Cellar (Pennsylvania Lines) and E. C. Keenan (N. Y. C.) and others told of high satisfaction with the telephone for despatching. The meeting brought out no dissenting voice. The telephone accomplishes great economy, but members who asked questions as to exact data received no answer. In most cases recent installations are less costly than earlier ones. The use of automatic telephone exchanges was looked upon favorably by several members.

R. E. Chetwood (Western Union) read a paper on "Screened Cable Conductors and their Application in Telegraph Service," which was briefly discussed. C. S. Rhoads (C. C. C. & St. L.) sent comments on this in writing. In closing the discussion Mr. Chetwood, answering questions, said that the screen only reduced interference from high speed circuits; that the cable is used largely for automatic circuits, and that other metals than copper had been considered for the screen, naming one cable with a brass screen. He said that very little was gained by loading screened cables.

There was a short discussion of the effect of aurora borealis on telephone and telegraph working, manifestations of this force having been observed in many places within the last two months.

Prof. C. A. Culver, of Beloit College, Beloit, Wis., gave a brief talk on radio (wireless) telegraphy and telephony. Great progress is being made in these fields. Recent inventions have simplified many processes, and next August an important patent expires. Professor Culver believes that high towers are no longer necessary for wireless sending. A relay for wireless communication is about perfected.

At Thursday's session, W. H. Hall (M. K. & T.) read a paper on "Censorship of Railway Messages," an abstract of which was printed in the *Railway Age Gazette* last week, page 1479. In the discussion of this paper J. F. Caskey (L. V.) told of the employment of a censor on his road for seven months, particularly for messages sent by Western Union lines under frank. All officers were instructed to send

copies of each such telegram to the superintendent of telegraph. Every message so sent was carefully edited and in many cases recast and unnecessary words cut out. He estimates the saving at $2,000 yearly in excess of the salary of the censor. The railroad telegrams of the larger offices were also censored, with the result that in one department alone an estimated wastage of $31 a day was reduced 85 per cent. The discussion on this subject showed that a number of roads have compiled comprehensive codes to be used in all departments. Mr. Caskey endorsed Mr. Hall's views in regard to the "mailgram." Such a system was being used on his road with success.

E. A. Chenery (Missouri Pacific) read from records showing the number of messages sent during the years 1913, 1914 and up to May this year from 12 important offices on his road. Since March, 1913, the total number of messages per day has been reduced from about 15,000 to 11,500 and the average monthly office expenses from about $8,500 to $7,300. This is the result of constant supervision and censorship. Mr. Chenery recalled the fact that Charles Selden, on the Baltimore & Ohio, did some effective censoring twenty years ago, by recording a charge for all railroad messages, the same as if they were to be paid for, and advising each department, monthly, of the totals for which that department was responsible.

H. D. Teed (St. L. & S. F.), in a written communication, told of the good results of censorship on his road. Formerly the officers sent letters very freely by wire. The "mailgram" system is very useful. These envelopes are a half hour quicker than ordinary train mail. In 1914 the number of railroad messages on Frisco wires was reduced very largely, as compared with 1913, and the total of the payrolls of the telegraph offices was reduced 18 per cent. In the relay offices the reduction was much larger than this.

The discussion of Mr. Hall's paper brought out considerable sentiment against the use of codes, based on the feeling that an excessive amount of time and work are required to code and decode messages. Simplicity is a cardinal principle in this matter and the use of ordinary language, properly condensed, may be the best way of adhering to this principle. Some departments have their own codes, for use between offices within their own control—the supply department and the auditor's department being mentioned—but that is not the telegraph department's concern. These short codes, prepared by departments, are probably a good thing; but a more comprehensive code is likely not to be appreciated. It was said that the American Railway Association's general code had never been adopted by anybody. One member remarked that the cost of railroad telegrams on his road, counting the wages of telegraph managers and messengers, was from 1½ cents to 2 cents a message. One large road had calculated that the total cost of railroad telegrams, including all expenses except maintenance of wires, averaged not over five cents a message; while the cost of coding, if done by a stenographer who is paid $75 a month, may add considerably to the total expense.

David Sarnoff, contract manager of the Marconi Wireless Telegraph Company of America, gave an interesting talk on radio telegraphy, questioning some of the conclusions of Professor Culver, the previous speaker on this subject. He referred to the use of wireless amplifiers as repeaters on the transcontinental telephone line. The two great difficulties encountered in the development of the wireless telephone, he said, were, first, to get a transmitter that will be adequate for the current, and second, the proper regulation of voice currents; but he expects to see the success of the process.

Mr. Foley (D. L. & W.) said that recently five messages had been sent by telephone, with his wireless apparatus, from Scranton, Pa., to Binghamton, N. Y., about 60 miles.

E. C. Keenan and J. J. Ross (Mich. Cent.) told of the very satisfactory use on the Michigan Central of special signals at non-telegraph stations to instruct freight trains to enter sidings. These signals are controlled by the despatcher by means of the selector calling-apparatus the same as is used to call station operators, the selectors for the outlying sidings being on the same wire with the station selectors. The signals are enclosed disks formerly used as block signals. They are not interlocked with the switches and are arranged to give the indication to the train by oscillating; and the conductor, having cleared the main track, acknowledges the signal by telephoning to the despatcher. Records for six months in 1914 showed the use of these signals 600 times, with 12 failures. These caused only slight delays except in one case. Answering questions, Mr. Ross emphasized the importance of care and accuracy in using this arrangement. If the despatcher sets the "head-in" signal at the wrong station he can cause annoying delays. It is important too to have the automatic "answer-back." The necessary modifications of apparatus have been made by the General Railway Signal Company and the Western Electric Company. All of these signals are on double track lines equipped with automatic block signals. More of them are to be installed.

St. Paul, Minn., June 20, 21 and 22, were the place and dates chosen for the 1916 convention.

The following officers were elected: President, E. C. Keenan (general superintendent of telegraph, New York Central, Lines West of Buffalo), Chicago; first vice-president, L. S. Wells (L. I.); second vice-president, M. H. Clapp (N. P.); secretary and treasurer, P. W. Drew (M. St. P. & S. S. M.), Chicago. Messrs. W. H. Potter and F. T. Wilbur were elected chairmen of the Eastern and Western Divisions, respectively.

UNIFORM TRAIN ORDERS

By J. L. Coss

Why is it that on a large railway system it is frequently found that the forms of orders and the instructions as to their use differ on different divisions?

For instance; one division may use the right-of-track order while on another its use is not allowed. One division may use the straight meet order, as between passenger trains while another will use the time order. There will also be found different wordings of certain forms of orders. On some districts forms which are not prescribed by the book of rules, are used freely. Especially will this be found to be the case when changes have been made in the despatchers, men from other lines using the forms they have been accustomed to until they are broken in; and sometimes they keep it up for a long time.

The general manager should have an experienced and competent despatcher on his staff to inspect the different despatchers' offices on the system; and this inspector should have the authority to require a uniform use of train orders. He should take the train order books and check back in them to see that the orders are used according to form; and should instruct all concerned in the manner of their use. He should also be qualified to render a decision on any order that may be in controversy. He should inspect the orders handled by operators at the large offices, as well as the small ones occasionally; and should see that block and clearance cards are made out correctly and handled properly. If a man is found who is not up to the standard in the handling of orders and other matters pertaining thereto, he should put him right, or recommend a remedy.

Train and enginemen, despatchers and operators are transferred from one division to another every now and then, and a form of order which they are not accustomed to may cause a difference of opinion, and possibly may result in something more than that.

This inspector, while on his trips, could look up other things for the general officer and in that way be of great assistance to him. A man from the general office, making visits of this kind occasionally, will have more influence on the employees than will local officers, even though they visit every week, for the men will know that if an irregularity is discovered the facts concerning it will go direct to the top.

Automatic Signals on Norfolk & Western Electrified Line

Installation of Most Modern Signaling in the Mountains of West Virginia, with Costly Refinements of Detail

The electrification of the Norfolk & Western between Bluefield, W. Va., and West Vivian, recently completed, made necessary the change from d. c. to a. c. operation for the automatic signals in this territory. As the signals in service before the electrification were practically new, it was deemed advisable to make use of them on other parts of the road and to install new a. c. signals on the bridges supporting the overhead power line.

The electrified section, known as the Elkhorn grade, is on the main line through the Pocahontas coal fields, about 105 miles west of Roanoke. The line is double track throughout, except in the Elkhorn tunnel, 0.7 miles long, which is single track. Between Bluestone Junction and Ruth there are two single-track lines, 2.9 miles and 1.9 miles long, respectively, which are normally operated as double track, both of which are signaled for traffic in both directions. The line has a large amount of curvature and heavy grades, varying from 1 per cent at the west end to 2.5 per cent just east of the Elkhorn tunnel.

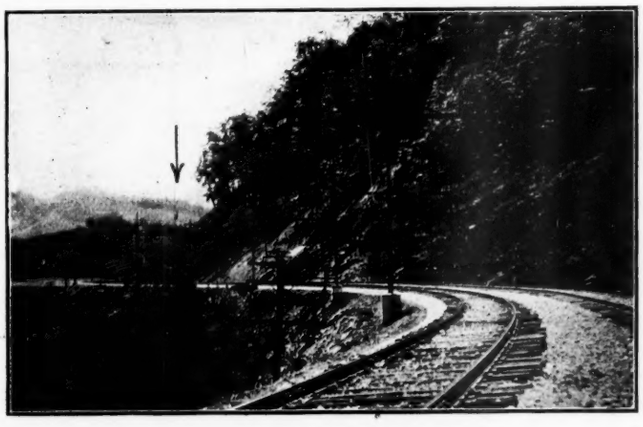


Fig. 1—Signal Near Graham, W. Va.

Single-phase, 25-cycle power is used for traction and 60-cycle power for the signal system. All current is generated at the company's power house at Bluestone Junction, about 10 miles west of Bluefield, where plenty of good water is available and the coal supply is convenient. For the propulsion current, three 11,250-kv.a., 25-cycle, 11,000-volt, single-phase steam turbine engine sets are used, current from these being stepped up to 44,000 volts and distributed to substations at Bluefield, Maybeury, Northport and East Vivian, and also to substation transformers in the power house, where it is stepped down to 11,000 volts for the trolley wires.

The 44,000-volt feeders for the propulsion current are carried on bonnet posts on the south side of the bridges, and the signal transmission line, consisting of two No. 2, B. & S. hard-drawn, bare copper wires, carrying 4,400 volts, are supported on bonnet posts on the north side. All signal control, telegraph and telephone wires are carried on poles at the extreme northerly edge of the right of way. In order to provide against induction in these lines from the high-voltage propulsion current, the main transformer substations were located somewhat closer together than was required by considerations of voltage regulation and losses; and to provide for emergency conditions when one substation may be out of service, or for excessively high current, which occurs in cases of short circuits and grounds, it was decided to install so-called track transformers, or "boosters," in the trolley and track circuits at intervals of about one mile. The purpose of these transformers is to cause the return current, a considerable amount of which would ordinarily leak to earth, to flow in the track rails and thus keep it at a fixed distance from the trolley wires and the telephone and telegraph lines. This required special consideration for the balancing of track circuits, and also for cross-bonding, to insure that there would be no lessening in the protection against broken rails otherwise provided.

Current for the signal system is generated in the power house by two 100-kv.a., 4,400-volt, 60-cycle steam turbine sets, connected directly to the signal transmission line. These are duplicate sets, one alone being of sufficient capacity to carry the entire signal load. The signal transmission line is carried on porcelain insulators and is broken at intervals of two miles on strain insulators. It is carried through a double-pole, single-throw oil switch at each of these points, so that it may be opened for testing or repairs.

A 1-kv.a., 4,400-110-volt transformer, having 5 per cent and 10 per cent taps for line-drop compensation, is used at each signal location, except at a few points where more current is required, 3.5-kv.a. capacity being provided in these cases. Each transformer is protected by 4,400-volt, graded shunt resistance multi-gap lightning arresters, and has 6,600-volt fused cutouts. The signal transformers, cut-out boxes and lightning arresters are mounted on the bonnet poles carrying the signal transmission wires. Screens are placed under these wires, so that persons on the bridges cannot come in contact with them. A hand-railing extends all the way around the platforms on the bridges, to which access is had by ladders at the north end. These platforms are not carried to the south end of the bridges, so that maintainers need not approach the 44,000-volt propulsion current feeders. The ladders on the north end of the bridges extend down only to a point 7 ft. above the ground, thus preventing unauthorized persons from climbing to the platform. The maintainers are provided with small ladders.

At each westbound signal location, the common wire is broken

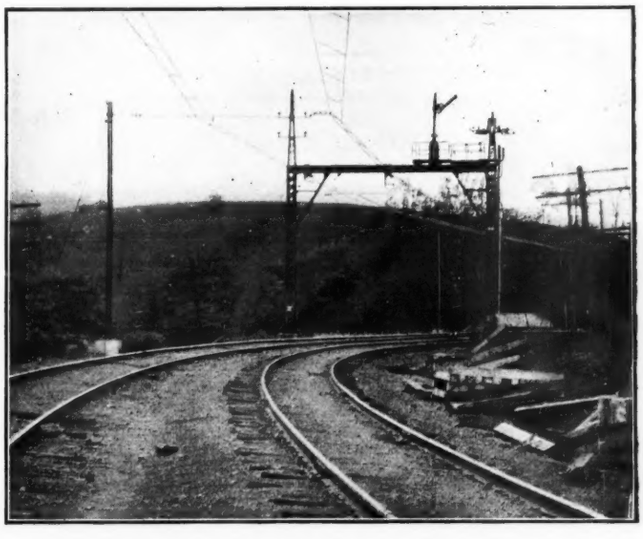


Fig. 2—Signal Near Bluestone Junction

and small one-to-one transformers are placed in the control circuit in order to minimize the effects of induction and to localize the effect of grounds on any control wire. These transformers and the lightning arresters are mounted on a wooden box on the signal bridge. Switches are provided so that current may be cut off from the signal while the maintainer is working about it. The leads for the track transformer are taken from the

transformer side of this switch, so that the signal in the rear is not disturbed when one of these switches is open.

Double-rail track circuits are used throughout, the average block length being 4,500 ft., while some of the circuits in interlocking limits are as short as 300 ft. The U. S. & S. impedance bonds on the main line have a capacity of 200 amperes per rail continuously, or 400 amperes for two hours. At the turnouts to colliery sidings and other places where a large amount of propulsion current will not be used, bonds which have a capacity of 50 amperes per rail continuously and 100 amperes for two hours are used. The track circuits are supplied by small air-cooled transformers. In three cases where track circuits are very long and ballast conditions bad, 1-kv.a. transformers are used. The track transformers are supplied from the 110-volt taps of the signal transformers. Reactance coils having an adjustable air-gap in the magnetic circuit are used between the track transformers and the track to limit the amount of current when the circuit is shunted and to adjust the current and phase relation in the track coil of the track relay.

All insulated joints are six-hole, Keystone, having bakelized canvas insulation. These joints in most cases are staggered, but at booster transformer locations they are placed exactly opposite, also at crossovers between the main tracks, the joints are placed opposite, so that an electric locomotive using the crossover will not deliver return propulsion current to one rail of the track circuit, thereby unbalancing it and blowing the relay fuse. The track relays are of the U. S. & S. centrifugal, two-element type. The track transformer, track relay, reactance coil and line relays are housed in cast iron relay boxes on concrete foundations at the base of the bridge on which the signal is located. Track wires are carried from the relay boxes to the tracks in 1½-in. fiber conduit, and the wires are carried to the signal transformer, transmission line, etc., in galvanized steel conduit. No. 14, B. & S. solid copper Kerite wire is used on all control and signal circuits, and No. 9 B. & S. stranded Kerite is used for connections to the track. All line wires are No. 10, B. & S., copper-clad double braided, weatherproof. At the track, a cast-iron box, with a cover and a hooded opening for the entrance of the wires, is placed over the end of the conduit and concreted. The wire is soldered to a short piece of bond wire, both ends of which are bonded to the rail. At a standard signal location, an 8-in. by 12-in. by 12-in. cast-iron pull box is located on the bridge just underneath the signal platform, and from this a 2-in. conduit is run to the relay box, a 1½-in. to the lightning arrester box, a 1¼-in. to the signal and a ¾-in. to the transformer, to carry the necessary control wires. These conduits are fastened to the pull box, relay box, etc., by lock nuts over cup washers and lead washers, making a water-tight joint. Rubber-covered wire, run in galvanized cable rings and suspended from messenger wire, is used for the connection from the pole line to the signal bridges.

SIGNALS AND INDICATORS

The 70 automatic signals required on this section are the U. S. & S. Co.'s style S, upper-quadrant, operated by 110-volt, 60-cycle induction motors. The signals are mounted on the top of the structural bridges, special attention being paid in the design of these bridges to the elimination of obstructions to the view of the signals. The signals have enameled steel blades and Armspear spheroidal lens lamps. These lamps were found particularly desirable in this case on account of the large amount of curvature in the line, and also because in a number of cases on curves it would be difficult to provide an entirely satisfactory view of the signals if ordinary lenses were used, because of the obstruction caused by overhead structures.

The photographic illustrations, Fig. 1 and Fig. 2, show typical situations where, if the engineman of a passenger train had to depend on a lamp throwing rays only in lines parallel to the axis of the lens, he would have but a few seconds in which to get a good view of the light. (In Fig. 1 the location of the signal is indicated by the arrow.) As is well known, enginemen running under conditions of this kind are liable to get into the habit of accepting a very poor indication, finding this more convenient than to watch out with the care necessary to get a view of the signal at the exact moment when it can be seen at its best.

The spheroidal lens was described in the *Railway Age Gazette*, September 19, 1913, in connection with a report of its use on the Long Island Railroad. It is so shaped as to spread the light of an ordinary burner 90 deg.; that is to say 45 deg. on each side of the axis. And this is accomplished without impairing the visibility of the light on tangents. Tests have shown satisfactory results with green lights at a distance of two miles and red lights at over three miles.

At short distances the differences between the ordinary inverted lens and the spheroidal are not great; but at 900 ft. from the light and 15 deg. from the axis the stellar magnitude of the inverted lens measures 0.50, while the spheroidal measures 4.25. In a test made 1,890 ft. from the lamp and 15 deg. from the axis, the light from an inverted lens was entirely lost while the Armspear at that point measured 3.00.

The lamps on the Norfolk & Western are similar in appearance to the well-known design shown in the Armspear Manufacturing Company's bulletin, except that, being electric, there are no ventilating parts at the top. The lamps have the standard R. S. A. sockets and have relays, specially designed for these lights, to cut in the second lamp in case the first one fails; and have spherical silvered glass mirrors for reflectors. All metal parts are made of No. 18 gage steel plates. The signal lights are 10-watt, 110-volt tungsten, current being supplied from the signal transmission line to these lamps as well as to stations, towers and yards, also for operating the motor-driven air-compressor set at the Elkhorn tunnel, and for lighting the warning signs where the trolley wire is low.

Switch indicators are provided at all main-line crossovers where a train could clear the main track. These give an indication for the block in which they are located and for two blocks in the rear. They are of the vane type and operate on 110 volts. At the ends of passing sidings and other points where the protection is necessary, triple-lock switch machines are provided. These are controlled in the same manner as the switch indicators and the switch is held locked upon the approach of a train. Shunt boxes are used on all main-line switches and siding derails.

INTERLOCKING PLANTS

The electro-mechanical interlocking plant at Graham has 14 working and 2 spare mechanical levers, and six electric levers. A similar plant at Bluestone Junction has 22 working and 2 spare mechanical levers, and 14 electric levers. All control circuits and indicators at these plants are d. c., operated by a battery of five 120-a. h. lead type cells, which are charged from a mercury-arc rectifier, taking current from the signal transmission line. The indication circuits for the levers in these plants are alternating current. Approach and route locking are provided for all through movements at all of the interlockings.

The electro-pneumatic interlocking plant at Elkhorn tunnel, which operates the switches on both sides of the tunnel, has a 17-lever machine with 13 working levers, which operate one three-arm, four two-arm, six one-arm and three dwarf signals, eight switches and five derails. Air compressors, with a capacity of 50 cubic feet per minute, driven by 15-hp., single-phase, 60-cycle motors, are used to supply air for the plant at the tunnel, and instead of extending the air line through the full length of the plant, two 15-cu. ft. per minute air compressors were installed at a crossover located 5,500 ft. west of the tower, these compressors taking current from the signal transmission line.

This installation was made by company forces under the direction of D. W. Richards, signal engineer, to whom we are indebted for the above information.

WOMEN CLERKS ON THE BRIGHTON LINE OF ENGLAND.—Young girls are now being taught the duties of booking and parcel clerks and telegraphers in a special school at East Croydon, organized by the London, Brighton & South Coast.

New Railroad Legislation in Fifteen States

Regulation of Innumerable Details, Large and Small, Operating, Legal, Socialistic; North, South, East, West

Laws affecting railways which have been passed in 1915 by the legislatures of fifteen states are abstracted below:

PENNSYLVANIA

Only two bills affecting railroads were enacted into laws as a result of the recent session of the legislature of Pennsylvania and neither of them affects operation. The governor vetoed the bill to repeal the full crew act of 1911, withholding his announcement of disapproval until eighteen hours after the time limit, although he acted on the bill and officially certified his action within the specified period. Other bills affecting railroad operation and equipment were defeated or died in committee.

The new acts affecting railroads are as follows:

Permitting testimony to be taken by examiners to be named by the Public Service Commission anywhere within the state and allowing appeals direct to the superior court instead of through the Dauphin county court, which has jurisdiction in state cases. The act may have bearing on pending appeals, of which there are a dozen, and an official decision is to be asked.

Changing period for reports on capital stock and loans for state taxation to the calendar year. Provision is made so that arrangements can be made for filing, under certain conditions, at times required for federal reports. Heretofore reports were required for an official year materially different from a calendar year.

A bill providing for a new railroad map of the state was vetoed.

As the result of an appropriation being allowed for maintenance, the Pennsylvania State Bureau of Railways, a branch of the Internal Affairs department, has been revived. Freeman C. Gerberich is again chief. The bureau is a constitutional office and it was sought to make it ineffective by withholding appropriations in 1913, the contention being that the functions were performed by the Public Service Commission. The bureau receives and files certain reports.

INDIANA

The Indiana legislature at its recent session passed the following laws relating to railroads:

House bill 11 authorizes the public service commission to compel railroads to place a flagman or install an automatic gong at any public crossing where the view of approaching trains is obscured, if unable to remove the obstruction.

Senate bill 239 amends the grade separation law to permit the public service commission in ordering any separation of grades to relocate or consolidate highway crossings over railroads, street railroads, interurban lines or suburban roads, and to relocate or control highways leading to any such crossings.

Senate bill 318 amends the public utilities act to allow railroads to furnish free or reduced service or transportation to any bona fide employee or officer thereof, to carry free or at reduced rates agricultural experiment and demonstration cars or trains and lecturers, and to carry at free or reduced rates its furloughed, pensioned or superannuated employees, persons who have become disabled or infirm in its service, etc.

House bill 110 prohibits intereference with railroad safety appliances, signal wires or telephone or telegraph apparatus.

MINNESOTA

Railroad laws passed by the Minnesota legislature this year include the following:

A bill requiring public service corporations to pay their employees at least semi-monthly the wages earned by them to within 15 days of the date of such payment.

A law providing for the sanitation, inspection and cleaning of stock cars.

An act enlarging the powers of railway companies, terminal companies, depot companies in respect of acquiring property by purchase or condemnation.

A law prescribing clearances.

A law regulating the furnishing of cars for the transportation of livestock.

A law authorizing the state railroad and warehouse commission to prescribe schedules of reasonable maximum rates.

OREGON

Railroad legislation passed at the recent session of the Oregon legislature includes a law to provide penalties for obstruction of railroad block signals, crossing bells, crossing gates, signal flags, torpedoes, etc. Another law requires reports of all industrial accidents to be made to the state industrial accident commission. Railroads will no longer be required to report to the labor commissioner, but are required to give immediate notice by telegraph, telephone or personally to the railroad commission of accidents attended by loss of life or limb or serious damage to property. Another law requires an annual accounting to be made to the commissioner of labor statistics by persons, firms or corporations withholding any portion of the wages of employees for the maintenance of any hospital or relief fund. The name of the Railroad Commission of Oregon is to be changed on July 1, 1915, to the Public Service Commission of Oregon.

NEBRASKA

The Nebraska legislature at its recent session passed the following laws affecting railroads:

Senate bill 26 provides that railroads shall furnish shippers of livestock with transportation of caretakers for shipments of one or more cars.

House bill 21 provides for cumulative voting and voting by proxy by stockholders of any company incorporated under the laws of Nebraska.

House bill 217 regulates the stringing of electric wires over railroad tracks.

House bill 304 requires express companies to properly house livestock entrusted to their care.

House bill 391 relates to destruction of weeds on railroad right of way and compensation therefor.

House bill 526 provides a penalty for injury or interference with telephone, telegraph or electric light wires and fixtures.

House bill 749 makes an appropriation for the use of the state railway commission to be used in the investigation of railroad rates.

NORTH DAKOTA

There were no railroad laws of any especial importance passed at the last session of the legislature of North Dakota. The following is a short summary of the laws that were passed:

House Bill 6 provides that railway cars shall be cleaned and disinfected before being used for transporting livestock into the state.

House Bill 154 provides that railroad companies shall build a hog-tight fence along their right of way when the owner of abutting property has enclosed the other three sides of his land with such a fence.

House Bill 159 provides that the state railroad commissioners may require railroads to build and maintain stock yards at stations.

House Bill 398 provides that a railroad corporation incorporated in one or more states increasing its capital stock shall pay to the state of North Dakota a fee on such proportion of the

increase as the mileage in the state of North Dakota bears to its total mileage.

Senate Bill 178 prohibits children from trespassing on railroad property.

Senate Bill 216 provides for the liability of railroad companies in case of employees suffering personal injuries. This law is substantially the same as the federal employers' liability act and applies to railroads engaged in intrastate business.

NEVADA

Laws passed by the Nevada legislature at its recent session include the following: An amendement to the state extra crew law, providing that the law shall not apply to railroad companies less than 95 miles in length, or on which but one train a day is operated in each direction.

An amendment to the electric headlight law, providing that any electric headlight "which will pick up and distinguish an object the size of a man dressed in dark clothes on a dark and clear night at 1,000 ft." will be deemed equivalent to a 1,500 c.p. headlight measured without a reflector. Section 2 of the act, which required such a headlight on the rear of engines when operated backwards at night, is repealed.

An amendment to the state railroad commission law prescribing regulations for the filing and posting of rates, and providing for the suspension of advanced rates by the railroad commission.

UTAH

The only legislation directly affecting railroads enacted at this year's session of the Utah legislature was the act prohibiting the transportation of intoxicating liquors into "dry" territory.

MISSOURI

The Missouri legislature, which recently adjourned, passed a law requiring railroads to maintain lights at night on main line switches and all lead switches in yards where cars are switched in making up or breaking up trains. The law does not apply to branch lines where trains are not run at night, or to independent lines of less than 50 miles in length, nor to trailing point switches on double track lines.

OKLAHOMA

The Oklahoma legislature at its recent session passed a law prohibiting railroads from maintaining or establishing a name for any railroad station other than the name of the town or city within which it is located, if the latter bears the name of the postoffice as given by the United States government.

ARIZONA

The only legislation affecting railroads enacted during this year's session of the Arizona legislature was Senate bill 36, providing that it shall be the duty of all railroad companies in the state to require section foremen or persons discharging like duties to keep at the section house a specified record of all stock killed or crippled upon their respective sections, which record shall be open and free for inspection by the public at all reasonable times. The law also provides that each engineer shall report to the railroad company on arrival at terminals all stock killed by his train, and that such report shall be posted on Monday of each week at the section or station nearest to the point where the accident occurred and shall be kept for 30 days.

FLORIDA

The 1915 session of the Florida legislature has just come to a close with less railroad legislation to its credit than any other in recent years. Only one bill was passed that might be called direct railroad legislation, and that was an act empowering the railroad commission to require the use of docks and terminals of a company operating the same under a franchise granted by the state or city, by any other such company. The Railroad Commission, after a hearing and investigation, is authorized to direct that track connection be made for transfer of freight, and the free use of the property by another such terminal company.

If the two terminal companies cannot agree upon terms of remuneration to be paid to the owning company, the railroad commission is to determine.

In the city of Pensacola, the Louisville & Nashville has large dock and terminal facilities. The city is contemplating the construction of a municipal belt line railroad and terminals, and the Louisville & Nashville would possibly object to this belt line railroad entering and using its facilities. However, this Act does not apply to municipalities that have elected Boards of Port Commissioners.

A large number of other bills were introduced during the session affecting railroad companies, but failed of passage. Among these were the "full crew bill," and one requiring running water to be provided in lavatories on passenger trains, with sanitary towels and soap.

SOUTH DAKOTA

The principal laws affecting railroads passed by the legislature of South Dakota at its recent session include the following:

Senate bill 55 amends the law with reference to taxation of railroad companies and other corporations, and provides for a tax on gross earnings and reports to be filed with the tax commission.

Senate bill 83 regulates the issue of warehouse receipts.

Senate bill 314 amends the law with reference to procedure before the state railroad commission and provides for the enforcement of commission orders by mandamus.

House bill 114 requires railroads whose rights of way divide farm lands to construct and maintain farm crossings when ordered by the railroad commissions.

House bill 271 prohibits railroads from increasing any intrastate rate or changing any classification rule or regulation without first obtaining the consent of the railroad commission.

House bill 272 authorizes the state railroad commission to reject and refuse to file any schedule or tariff of rates, rules or regulations unless handed to the commission not less than 30 days before the effective date.

House bill 175 gives the railroad commission authority upon petition to require railroads to construct track scales for the weighing of freight in carload lots from team tracks at any station at the expense of the shippers petitioning for such scales.

Senate bill 288 authorizes the railroad commission to prescribe rules for the weighing of carload lots and of livestock at track scales and of other commodities in ton lots. The commission may require all track scales to be sealed.

Senate bill 142 authorizes the railroad commission to require all railroads to erect at any station in the state proper and suitable stock yards and to equip them with feed troughs, racks and watering troughs and water supplies.

House bill 348 provides that on failure by a common carrier to appeal from any final order of the railroad commission or upon the affirming of any order from which an appeal has been taken, the railroad commission is authorized by mandamus to compel carriers to comply with such orders.

IDAHO.

Laws affecting railroads enacted by the Idaho legislature at its recent session include the following:

Minor changes were made in provisions of the public utilities act including an amendment to the anti-pass provisions withdrawing the power of the utilities commission to designate the state officials to whom passes may be issued and enacting that passes may be issued to the members of the commission, or such of its officers and employees as the commission may designate, when traveling exclusively in the transaction of public business, or to such other state or county officials to whom the issuance of free transportation may be authorized by law. The amendment also enlarged the class of persons to whom passes may be legally issued to include veterans of the civil war. There was also enacted a uniform bill of lading act. Certain amendments were also adopted to the laws relating to the issue of bonds and notes by railroad corporations and the execution of mortgages to secure them.

WASHINGTON

Railroad laws passed at the recent session of the Washington legislature include the following:

Senate bill 144 regulates the issuance of bills of lading and the rights, obligations and liabilities thereunder.

Senate bill 258 authorizes the Public Service Commission of the state to suspend increases in rates for a period of 90 days with a possible extension for 60 days, pending a hearing and decision.

Senate bill 215 makes certain amendments to the laws regulating the purchase of railroad stocks, bonds and property by railroad companies. The law provides that the purchase, sale, consolidation or lease of another company shall be approved or ratified by persons holding 75 per cent of the capital stock of the company selling or disposing of its stock or bonds or leasing or otherwise disposing of its property. The law also provides that no railroad or transportation company shall consolidate its stock, property or franchise with that of any other railroad or transportation corporation owning a competing line, or purchase either directly or indirectly any stock or interest in a railroad or transportation company owning or operating a competing line. The law also requires the approval of the Public Service Commission for the consolidation of railroads and provides that the capital stock of the company formed by such consolidation shall not exceed the sum of the capital stock of the companies consolidated at the par value.

TRANSPORTATION AND CAR ACCOUNTING OFFICERS

The summer meeting of the Association of Transportation and Car Accounting Officers was held at Niagara Falls, Ontario, June 22 and 23, with 130 members in attendance, and J. M. O'Day (I. C.), president, in the chair. At the opening session there was an address by E. F. Kearney, president and receiver of the Wabash, who, while general superintendent of transportation of the Missouri Pacific, represented that company in this association. Mr. Kearney spoke at length on the causes leading up to the present agitation against railroads, calling attention to the fact that railway officers and employees were themselves largely to blame. He advocated the maintenance of high moral and business standards. He regarded patriotism as one of the greatest essentials in raising standards; if the ideals of patriotism are thoroughly instilled into the minds of the younger generation the old-time bad or questionable practices will not be repeated.

The report of the executive committee shows a membership operating 249,718 miles of road and having in service 2,557,365 cars. It was decided to continue the consolidation of the committees on conducting freight and passenger transportation and the committee on joint interchange and inspection bureaus for the succeeding six months, the combined committee to be known as the "Committee on Conducting Transportation."

The committee on car service reported the action of the Freight Claim Association at its Galveston meeting, wherein that association decided that demurrage or storage refunded under legal liability or when uncollectible owing to negligence in transportation shall be charged to the liable line or lines. The effect of this rule (which was approved) will be to make the lines which are liable for the freight charges on refused freight also liable for demurrage charges on such shipments; demurrage charges, when legally assessed, are a matter of filed tariff and cannot be voluntarily waived.

The association adopted for submission to the American Railway Association the proposed addition to the Switching Reclaim Rules of a definition to cover "intra-terminal switching," viz., "A car loaded within the switching limits for unloading within the same switching limits." It is provided that no reclaim shall be allowed for an intra-terminal switching movement.

The association concurred in the findings of the committee to the effect that at present there should be no change in Rule 8 to relieve the holder of the car from per diem where material for repairs has been shipped by the owner and lost in transit; but the committee requested that the subject be referred back. The findings of the committee were also concurred in, that, where the holding road orders material from the owner for repairs to a car and such material is not used because other material has been found, such a case does not come under Rule 8. In connection with the question of the advisability of establishing a reclaim for per diem on cars undergoing repairs or transfer because of the delivering line's responsibility, the committee on car service presented a recommendation to the effect that no reclaims should be presented or allowed under Car Service Rule 15; that at points where such reclaims had been in effect they had been eliminated by reason of the fact that experience demonstrated that the conditions were so thoroughly reciprocal that the amount involved in the reclaims did not pay the expense of the accounting incident thereto. The recommendation of the committee was adopted.

The association adopted for submission to the American Railway Association proposed form of per diem Rule 13, providing that reclaims under Rules 5 and 14, or on account of special conditions, must be presented within one year from the last day of the month in which the per diem is earned; this, however, will not prevent the continuance of any reclaim after the period named if it has been previously opened, even though the reclaim should eventually rest upon some road other than the one originally addressed, except that the privilege of continuance shall cease when the claimant fails to return reclaim or present it to another road within a period of six months from date such reclaim is last returned to claimant. The amended rule also provides that reclaims under this rule must be made by the designated transportation officer of the road which pays the per diem to the designated transportation officer of the road from which the allowance is claimed, unless specifically agreed by the interested roads to permit the presentation and acceptance of such reclaims by local representatives.

The proposed form of per diem Rule 14 as presented by the committee was also adopted for submission to the American Railway Association. The amendment to the rule provides that a connection intending to reclaim against a delinquent line for its failure to accept cars shall notify such delinquent line daily, prior to midnight, through the designated officer, or in such manner as may be agreed upon locally, of the cars held for it; also that when the hour at which the receiving road clears the interchange track is so late that the delivering road cannot deliver before midnight, the receiving road is to be responsible for the per diem on such cars for the following day, subject to local agreement as to time required to make delivery.

The committee on continuous home route cards reported that about 250 railroads are using the standard continuous home route card. The discussion on this report showed that those roads which have not adopted the card are deferring action principally for the reason that they do not wish to incur any obligation, under the rules, until, by the action of the American Railway Association, all roads are placed on a common basis. While much empty mileage can be saved by short-routing empty cars home, there must be a good deal of education of agents if they are to be allowed to do this on their own initiative. Thus far there has been much imperfect work, cards being filled out in a very slovenly manner.

The committee was requested to present a method for computing the saving in empty car mileage by the adoption of the standard continuous home route card.

The list of accepted assignments of reporting marks to cars of private ownership, presented by the committee on office methods and accounting, was adopted for submission

to the American Railway Association. The report of the committee indicates that approximately 385 owners of private cars have accepted assignments of reporting marks and are applying them to their cars. The marks are limited to four letters, of which the last letter shall be "X."

The committee is also engaged in assigning marks to cars of railroad ownership with a view to preventing duplicate marks. Assignments of marks have been made to every standard gage railroad in the United States, Canada and Mexico. The marks assigned to railroads are limited to three letters, except in certain instances where the short "&" is used to enable car owners to use reporting marks which correspond to the corporate initials of the owner. Up to the date of meeting 407 railroads have accepted the reporting mark assigned.

The committee has prepared forms for the collection of data relating to the subject of per diem, and these forms will be forwarded to members for the compilation of the data required by the committee for the period July, 1915, to December, 1915; and upon receipt of these statistics the committee will present the same to the American Railway Association as indicating the condition of per diem records of American railways generally, such data affording a basis for future action affecting per diem discrepancy claims.

The association adopted for submission to the American Railway Association the proposed form of car tender report and the proposed form of summary of per diem reports as presented by the committee.

Acting in compliance with the request of the American Railway Association, the committee on office methods and accounting reported that, after a series of conferences held between representatives of the Freight Claim Association and representatives of the Transportation Association, by joint action of representatives of the two bodies a code of rules, governing the application, inspection, recording and care of car seals was adopted, for presentation to the Freight Claim Association and the Association of Transportation and Car Accounting Officers for joint action by the respective associations. The Freight Claim Association at a meeting held June 16, adopted the rules presented. The Association of Transportation and Car Accounting Officers at this meeting also adopted the proposed rules for submission to the American Railway Association. These rules as adopted embody very full and elaborate instructions for the guidance of the seal inspector.

The association adopted for submission to the American Railway Association the recommendation of the committee on handling railroad business mail, that packages containing claim papers shall bear on the face thereof the fact that they relate to the business of the carriers handling the same.

The committee also recommended that roads receiving letter mail on which postage is due shall keep such envelopes, and where repeated instances from the same source are noticed the department at fault shall be advised of the inadequacy of postage. If the practice should not cease a corrective may be applied by rendering bill against the particular department of the carrier at fault, accompanying the same by a file of envelopes showing the postage due. The committee also recommended that all inquiries relative to the handling of railroad business mail be forwarded direct to the general secretary of the American Railway Association.

The association adopted the recommended form of yard check book as presented by the committee on conducting transportation. This form, in addition to providing space to show date and time of check and signature of man making the check, shows the following heads as necessary: Initials, Number, Condition (Loaded, Unloading, Empty, etc.), Location, Weather Record, Class of Car, Capacity of Car, Lading and Condition of Driveway at Team Tracks.

The association adopted for submission to the American Railway Association the recodification of car service rules as presented by the committee on conducting transportation. The rules as presented provide for a separation of the car service rules relating to freight equipment cars from those relating to passenger equipment cars, the freight rules being numbered from 1 to 17, while the passenger rules are numbered from 101 to 113. In the recodification the committee presented a passenger car rule providing that "A foreign passenger equipment car must be promptly returned to its owner via the route and junction point received, unless the owner otherwise agrees. A road responsible for delay will be charged per diem rates in addition to mileage for the period of delay." The passenger car rules also provide that "Should a passenger equipment car, without consent of the owner, be delivered to a road other than connection from which received, the road responsible shall pay to the owner the per diem rate from the hour of appropriation until the hour car is returned to its owner or to the joint service and in addition thereto the established mileage rate shall be paid the owner by each road using the car."

The committee also reported that the committee on joint interchange and inspection bureaus at Toledo, Ohio, has completed its work and submitted its report and recommendations to the general managers, and that at Cincinnati a committee is at work with a view to installing a bureau in zones, contemplating eventually covering the entire terminal.

The election of officers resulted as follows: President, J. T. King (Atlantic Coast Line); first vice-president, F. E. Higbie (Central New Jersey); second vice-president, J. W. Nowers (A. T. & S. F.); secretary, G. P. Conard (75 Church street, New York); treasurer, F. M. Luce.

It was decided to hold the next meeting at St. Louis, December 14 and 15, 1915.

THE BATTLE OF THE MARNE

By WALTER S. HIATT*

Never in railroad history have men worked under operating conditions similar to those that existed in France during late August and early September last when the territory to the northeast of Paris became the scene of one of the most gigantic battles of the war.

The role the railroad men played in that battle is but vaguely understood even at this late date. In the frightful scramble that preceded the battle of the Marne, the railroad officers in Paris gave out the following notice to their employees: "Think of your helpless wives and children; work to get troops to the front." These men, thinking of what the Germans had done to women and children in Belgium, worked like demons, slept and ate at their posts for two weeks, and strained every nerve to get troops to the points required. The 17 railroads of the German government, all built with an eye for military purposes, may be admirable from the standpoint of construction and operation. They have certainly done great service in the war, but they have not to date been tried by the fire that assailed the French railways.

In a previous article I have sketched the general features of the mobilization in France, and showed how the railroads responded magnificently to the demands made upon them. I have also showed how 10,000 trains were kept going during the 20 days of the first period, transferring men from their homes to their regiments, thence to their army corps and to the front; and how the mad throngs of the civil population were cared for This work was done without serious accident; the roads held up under a tremendous pressure, and they are today running as in times of peace.

But it is the work connected with the battle of the Marne that must forever form a monument to the French railroad men. It has already gained for them the gratitude of the French people, as has been indicated by the bestowal of the cross of the Legion

*The second article from our special European correspondent. The first appeared in the *Railway Age Gazette* of May 21, page 1047.

of Honor on dozens of station masters, enginemen, firemen, conductors and others. No soldier, or "hairy" man, as they call the unshaven heroes of the trenches, has given a better account of himself, or made more untiring sacrifices for his country than have the *cheminots,* the railway officers and employees.

"Then came Charleroi," is a phrase found in every soldier's account of the early campaign. The fall of Charleroi was the beginning of the battle of the Marne. In war time the French railways are under the control of the war department, the operation of each road being directly in charge of its own commission, consisting of a military commissioner and an operating director, who report to the war department's transportation officers. On August 17, the minister of war had issued a note of thanks to the various roads stating that, as the work of concentration was about finished, the government wished to acknowledge the efforts of the railroad employees and officers in preparing the way for victory.

This was the first brilliant period of the war when the nation was resounding with the glorious resistance of Liège and the rapid invasion of Alsace and Lorraine. The 58 German army corps forming the eight powerful armies thrown on France as the first big stroke of the Germans were still at the frontier and their terrific blow, so deliberately planned, had not been struck. The railroads of France had just finished concentrating her seven armies, and between August 12 and 20 the Northern, Western and Orleans railways had hauled the little English army of about 200,000 men from Boulogne, Nantes and Saint-Nazaire to Mons, handling 420 trains, many of them at six minute intervals, without disturbing the general concentration work of the French army.

The railroads were settling down to the more steady work of carrying food and ammunition to the front, and bringing back the wounded to Rheims and Châlons. Each of the six armies along the front from Maubeuge to Belfort, the seventh being at Paris, had its own central commissary, the vast stores of which were being renewed each day by the 42 trains set aside for that purpose. To be sure, there were a few changes of front to be made for certain army corps. The railroad men also had to take into account that the fifth German army under the Crown Prince had cut the line connecting the Northern and the Paris-Lyons-Mediterranean lines just south of Longwy, and that this meant new connections; but on the whole, the work was not too severe. On August 20, however, near Morhange, the army of Bavaria, the sixth German army, drove back the French to the river Meuse and united with the fifth. On August 22, at Charleroi, to which the Paris-Lyons-Mediterranean a week before had so proudly brought 60,000 troops across France from Africa, the battle began which lasted until the 26th and ended in a French defeat.

COVERING THE RETREAT

While the battle raged—the generals having orders to hold their positions as long as possible—the railroads were told to make ready to save as many as possible of the troops who otherwise might have been lost, for in a retreat foot stragglers are an easy prey. General Joffre insisted that the trains wait until the last. He wanted the men for the big coup which he seemed already to have decided upon.

But meanwhile, before the fall of Charleroi, the railroads were also busy doing what they could to save the civil population fleeing out of Belgium and the invaded French provinces all but submerged by the Teutonic flood. Some of the Belgians went to Holland; others went by boat to England. Several hundred thousand were placed in cars and transported to Calais and Havre, or directly to Paris with the French refugees. Further, no less than 2,700 Belgian locomotives were run upon French rails towards Paris and saved.

On August 23 the little line from Sedan to Lerouville was still open. While the troops disputed every foot of ground, burning or blowing up fine steel bridges as they retreated, hundreds of trains were being used to save the cannon, the munitions, and other valuable material. Even the food was gathered from the storehouses so that nothing would be left for the Germans. All these trains were directed to the points along the Marne indicated for each army corps. On some of these days 120 trains, and on others as many as 170 were used in this vast retreat.

Von Kluck's army, the German right wing, was meanwhile advancing toward Paris. To check it a little, other hundreds of Eastern, Western and Northern trains were rushed to pick up all the troops that could be spared from before the left wing in the Argonne region and to swing them around to form a new army behind Lille and Arras.

The biggest thing of all, however, was to transport an army from along the Meuse, north to Verdun, to within 18 miles of Paris, to block the passages to the coveted city. This army, composed of the fourth, sixth and eighth army corps was supposed to be defending the Meuse to the south of Longwy. When that place capitulated on August 27, these three army corps, leaving but a skeleton behind, were put aboard 180 waiting trains and hurried through Verdun, Sainte-Menehould, Châlons, Bar-le-Duc, Chaumont, Troyes, to Raincy, whereby within a week the army made an entire change of front. Owing to the marvelous efforts of the railroad men, this army of about 100,000 men later played the chief role in the battle of the Marne. It was the lost army which the Germans located too late. Near Raincy it was joined by the little English army, rushed in the nick of time to Crécy-en-Brie, and by the army of Paris which was thrown out at the last minute on railroads, in automobiles and almost on foot, helter-skelter.

The army of General Manoury which the railroads assembled behind Rheims, and the two armies assembled at Nancy, where Generals Castelnau and Sarrail took the offensive against the Crown Prince, then fell upon the Germans from three sides, caught them as in a sack, and there followed the bloodiest and most decisive battle of the war. The Germans as a result of it were pushed back to a position behind the river Aisne, which they were able to hold only because the French grew short of ammunition and had to rely on blank cartridges, rob the German dead of their rifles and cartridges or make bayonet charges when these means failed.

The sleepless railroad men behind meanwhile were practically scouring France for more troops and bringing up others to take the places of the fallen.

GOLD TRAINS AND PALACE CARS

Panic reigned everywhere but among the *cheminots.* The French government, on its part, as a matter of sound prudence, determined to move to Bordeaux. Three special trains were made ready for this purpose before midnight of September 2, and arrived without accident or incident at Bordeaux the next day. The first train, composed of six sleeping and parlor cars, carried President and Madame Poincare, and arrived at 12:05. The second train, carrying Monsieur Viviani and other ministers, arrived at 12:25 and the third train, with more ministers and their secretaries, arrived twenty minutes later at 12:45. Later in the day arrived other trains concerning which but little has been said, arrived carrying the $800,000,000 gold deposits of the Bank of France, the valuable state papers of France, and all the documents necessary to keep the government going on an official footing. After the removal of the government, other trains were forthcoming to carry away the precious paintings and statuary and other treasures of the Louvre, in the Luxembourg gallery and other places.

The cool-headed though bodily wrought railroad men had yet more to do. The officers of the government left openly, announcing that their removal was a measure of prudence and not of cowardice. After they had gone, the people in Paris came upon some frightful hours. The city was apparently calm, but it realized at last what was happening, and even the bravest and the most carefree determined that it was time to move to places of greater safety. At the American embassy, notices were printed to be tacked on houses belonging to or inhabited by American citizens,

warning the German soldiery to respect the rights of neutrals. These notices were never circulated. So it came about that in these frightful hours when Paris thought it was lost, while the railroads were desperately hurrying men and munitions forward, they also began to carry refugees from Paris by the hundred thousand. All the north of France was bent on flight. The terminals in Paris, in fact, became so crowded that the alarmed people hurried out on the roads, pushing their carts loaded with valises, trunks and household treasures before them.

Large numbers slept at the stations. The line at the Saint-Lazare station was 200 yd. long and that at the Orleans station 300 yd. long. Mothers with babes in their arms waited for 24 hours on the sidewalks, and they and others, when the chance came, thronged upon flat cars and into box and cattle cars. All sorts of cars took away 50,000 people daily. It took three days to make a trip that today takes three hours, for the military train had to pass at all hazards and had the right of way. They passed and passed eternally, it seemed, a few minutes apart, night and day.

The railroad men continuing at their posts of duty, were conscious that on them depended the safety of the women and children, as well as that of the troops. Their patience was tried beyond belief, but they remained at their posts. Never in this world, surely, have railroad men given such proof of their readiness and courage.

In all France was there but a single example of a *cheminot* who failed in his duty, and that example is widely known because of its singleness. A station master at Rheims, it is said, was discovered just before the Germans began arriving there in telephone conversation with a German officer somewhere out in the country. Fate would have it that the man's own boy led the French officers who were looking for him to give him orders, to the telephone booth. Of course the station master was executed as a spy.

Each day brought new difficulties. On the Northern and Eastern railroads, half of whose trackage was within the German lines, there were no more machine shops or roundhouses available. New ones had to be improvised. Right behind each locomotive was hauled a sort of wrecking car, wherein the train crews ate and slept, and wherein were carried relief crews and repair materials.

WORK, ALWAYS MORE WORK

With the German flood dammed and flung back upon itself, the task of these overworked railroad men nevertheless continued. They had to bring up re-inforcements to the River Aisne where the Germans halted in their retreat from the Marne. Fresh troops, more food, more ammunition had to be carried forward. The returning trains carried back more refugees, took German prisoners to the east and south, and hurried the thousands of wounded to the hospitals.

While the cannon were thundering along the Aisne, the spare railroad men about the shops of Paris and Lyons and Orleans were put to work manufacturing wagon, caisson and cannon wheels, shells and even cannon parts. These they loaded on cars. They helped hurry the heavy cannon from Creusot and Saint-Chamond to the Aisne to answer those the Germans had brought up, and emptied arsenals of their 50-year old mortars, now once more of use in the siege warfare of the trenches.

Trains carrying troops, ammunition, cannons, food and other supplies were run ceaselessly. In five weeks one of the six railway companies ran no less than 1,600 provision trains, part of the run being made over lines new to the crews. At one time no less than 1,300 locomotives and 4,000 men were thus detoured.

DETAILS OF THE RAILROAD BATTLE

Amid this seemingly hurly-burly one astonishing transportation feat was accomplished right after the battle of the Marne by one railroad when 52 ships arrived at Marseilles in the south of France with 70,000 Indian troops and their immense amounts of baggage. In *three* days these troops were discharged at their camping ground of Cercottes near Orleans, where they remained 20 days before proceeding to support the English at Nieuport-Dixmude.

The people remaining in the regions covered by the German invasion had to be fed and provided with the necessaries of life. From September 21 to November 14, 43 different trains were made up in different parts of France for this purpose.

A mail service, beginning on a large scale from the end of September, demanded a mail car a day attached to every train to carry the millions of letters and packages sent to or by the soldiers. Gradually the railways also put themselves in position to take care of regular demands of commerce. Schedules were arranged on a stationary basis by October. The civil life of the country now goes on as usual.

One apparent explanation of the success of the railroad men in this ordeal is to be found in the network of roads that spreads over France, fan-like, with Paris as the center. When one route is interrupted there almost is always a possible detour.

Another thing which has contributed so largely to the success of French arms has been the unfailing good will, and the easy going spirit with which the railroad men are blessed. Often irritable in small things, the French railroad man, trained in a hard school, is never seriously annoyed for any long period by any kind of a job. When all seems lost, he begins to look for daylight. War, anyway, is an energizer, and it has found a fertile field in the French in the midst of their greatest trial.

RAILROAD SECURITIES HELD ABROAD

The following is the gist of the statement given out by L. F. Loree, president of the Delaware & Hudson, in regard to the investigation which he made of the amount of American railroad securities held abroad:

Requests were sent to 145 railroad corporations, being all the railroads in the United States above 100 miles in length. Replies were received from 136 companies, 100 companies furnishing statements of securities held abroad, while 37 replied that none of their securities was so owned. Eight companies have not yet replied, and of them seven are of minor and one of medium importance, the combined mileage being 3,725 miles. They cannot materially affect the result.

The stocks were identified by entries in the transfer books of the issuing companies. To the extent that they may be carried in the names of domestic bankers, brokers, or institutions, for foreign holders, the amount would be understated. Inquiries indicate that such holdings will not exceed $150,000,000 par value.

The bonds were in the main identified by the "slips" filed by the payee under the requirements of the federal income tax law. Where interest is in default there would be no income

RAILROAD SECURITIES HELD ABROAD

Security	On or before January, 1919	Jan. 1, 1920, to Dec. 31, 1924	Jan. 1, 1925, to Dec. 31, 1929	Jan. 1, 1930, to Dec. 31, 1939	On and after Jan. 1, 1940	Grand total
First preferred stock	.....	.....	.....	.....	.....	$161,280,900.00
Second preferred stock	.....	.....	.....	.....	.....	99,900.00
Common stock	.....	.....	.....	.....	.....	633,802,162.00
Notes	$54,921,000.00	$6,438,640.16	$16,000.00	.....	.....	61,375,640.16
Receivers' certificates	998,000.00	.....	.....	.....	.....	998,000.00
Collateral trust bonds	5,606,000.00	71,060,567.00	10,082,000.00	$8,408,000.00	$132,453,848.26	227,610,415.26
Equipment bonds	1,332,000.00	1,129,700.00	14,902,589.00	.....	.....	17,364,289.00
Car trusts	792,000.00	16,000.00	.....	.....	.....	808,000.00
Debenture bonds	33,210,000.00	928,000.00	85,941,500.00	82,693,160.00	1,232,650.00	204,005,310.00
Mortgage bonds	16,129,400.00	62,365,367.00	182,978,300.00	180,952,216.00	826,631,443.00	1,269,086,726.00
Total	$112,988,400.00	$141,938,274.16	$293,920,389.00	$272,053,376.00	$960,317,941.26	$2,576,401,342.42

tax certificates in respect of coupons not paid, and to that extent the amount would be understated.

The information was determined from data collected from October, 1914, to April, 1915, and during that period there have been large sales of these securities for foreign account in the American markets, and to that extent the amount would be overstated.

There are held in France several hundred million dollars' worth of American railroad securities that are not repayable except in francs and that cannot in any likely contingency come upon this market, unless as a result of action by the French government. Where such bodies are in default it may be that there will be issued in place thereof, when reorganization is carried through, bonds payable in dollars. The amount of such bonds in default is not great.

There are held in Great Britain many of these securities by life and fire insurance companies that are likely to be held against calamities. There are also large amounts held by trustees and people of large means in that and other countries likely to be retained as insuring an income against any possibility of disaster.

It is believed that this information is of such general importance as well as of such particular importance to the railroads as to warrant a continuance of this investigation, especially in view of the large amount of these securities that have since the beginning of the European war been returned to this market. Blanks will therefore be sent later in the year to the 100 companies as above, with the request that information be reported for the six months, July 1 to December 31, as to bonds and other evidences of indebtedness, and for July as to stocks.

CALCULATING CROSS SECTION AREAS ON RAILROAD VALUATION WORK

By F. T. Morse

Assistant Engineer, Chicago, Rock Island & Pacific, Chicago

The cross section of the roadbed of a railroad taken by the government valuation field parties is so different from that taken on the original surface of the ground at the time of construction that the ordinary formulas or methods do not apply. The following method of calculating such areas quickly was developed in checking over the I. C. C. inventory notes now being taken on the Chicago, Rock Island & Pacific.

In the accompanying diagram are shown typical sections as taken by the I. C. C. field parties, Fig. 1 being in embankment on a branch line where the roadbed is surfaced with dirt only, Fig. 2 in embankment where there is ballast, the top of the section being the bottom of the ballast, Fig. 3 in cut, and Fig. 4, a side hill section with both cut and fill. In each case 0.0 is the top of tie.

As no vertical distance through the required area is given, one cannot conveniently draw triangles and figure the area in the usual way. However, by enclosing the section in a rectangle, triangles or trapezoids are obtained which may be easily figured and their area subtracted from that of the rectangle giving the required section area. The general method has been expressed in letters, then these terms expanded and many cancelled, leaving the result as indicated. The method in Fig. 1 is used when the area between the ends of the ties is in the form of triangles. In Figs. 2 and 3 this area is a rectangle or trapezoid. The same method is used to produce the formula as shown below Fig. 3, which is exactly the same as in Fig. 1, with the addition of the two terms -dd and -ee, which take care of the difference in area between the ends of ties in the two cases. In cut sections, as in Fig. 3, it is necessary before multiplying to add to each elevation reading an amount equal to the greatest minus reading, to bring the reference line A-B to the lowest point of the cross section so that we have the general type of section shown in Fig. 2.

The application of this method to a side hill section is shown in Fig. 4. Ordinarily the government engineers plot all irregular or peculiar sections and measure the area with a planimeter, but the same general method explained above can be applied to such cases also if desired.

With practice most of the multiplying may be done mentally or by the machine when necessary, and the results recorded at the same time, using an Ensign electric calculating machine or a comptometer, with the minus quantities in the right hand three columns and the plus quantities in the left hand three columns. When the last multiplication is completed the total plus and minus quantities can then be read on the machine, mentally subtracted and divided by two, giving the desired area.

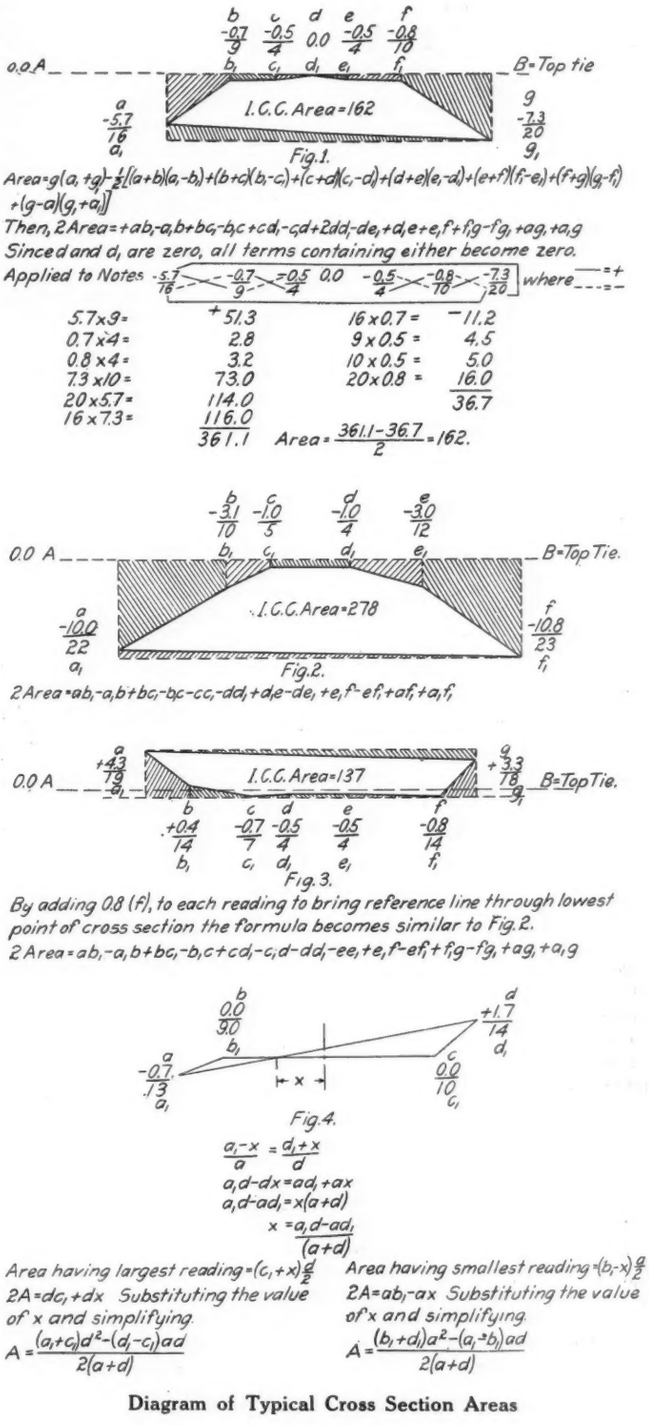


Diagram of Typical Cross Section Areas

General News Department

Among the bills aimed at the railroads which have been prepared for introduction in the Alabama legislature are a "full crew" bill, a maximum train bill, an anti-negro helper and fireman bill, and an employers' liability bill, all prepared by railway labor union interests.

H. U. Mudge has resigned as a member of the western group of the Presidents' Conference Committee for the Federal Valuation of the Railroads. H. C. Phillips, valuation engineer of the Atchison, Topeka & Santa Fe, has been elected assistant general secretary of this committee.

The railway department of the American Federation of Labor has issued a notice officially calling off the strike of the mechanical department unions which was declared on the Illinois Central, the Harriman Lines and the Pere Marquette in 1911. From the point of view of the railways the strike was terminated over three years ago.

The freight clerks of the New York, New Haven & Hartford, who have been threatening to strike finally agreed, on June 24, to submit their claims to arbitration, the leaders of the brotherhood and the officers of the railroad company having agreed to leave disputed questions to G. W. W. Hanger, assistant commissioner of mediation, at Washington.

The Pennsylvania Railroad announces that the operation of electric trains between Broad street, Philadelphia, and Paoli, will not begin until about the middle of August. Copper, needed for changes to be made in the overhead structure, cannot be had without considerable delay because of the pressing orders for munitions of war on which American shops are now engaged.

Reports from Ottawa say that the agreement between the government and the Grand Trunk Pacific for the operation by the government of the branch of this road extending to Fort William has been concluded, and that the rental to be paid is $600,000, said to be equivalent to 4½ per cent on the cost of the line. Included in this property are the extensive terminal facilities at Fort William.

The Canadian Department of Labor has appointed a board under the Industrial Disputes Act to deal with a difference which has arisen between the Canadian Northern and two brotherhoods, those of the locomotive enginemen and the firemen. The men have asked that the conditions under which they work in the East be raised to the level of conditions prevailing on the Western lines.

The Erie Railroad has sold four of its largest steamships which are in use on the Great Lakes, and the ownership of which the company has to divest itself in accordance with the recent decision of the Interstate Commerce Commission. It is understood that the boats will be cut in two and taken through the St. Lawrence river to the Atlantic ocean, there to be again put together and to be used by the purchasers in the coastwise trade.

The Interborough Rapid Transit Company, New York City, has reduced the working hours of all employees of the station department from twelve hours a day to ten hours, with no reduction in pay. This puts the station men and train men on the same basis as regards hours. The order affects 1,927 persons, about two-thirds of whom are on the elevated lines and one third in the subways. It will be necessary to employ about 20 per cent more employees in this department.

The Interstate Commerce Commission, Division of Valuation, is preparing to issue Orders Nos. 17, 18 and 19, requiring telegraph, telephone and railway companies, respectively, to furnish information regarding the purchase of materials and rates of compensation similar to that required of the railways under Valuation Order No. 14, issued some time ago. Only those carriers are expected to furnish this information upon whom these orders are served.

A party of officers of the Chicago Great Western left Chicago on Monday on a special train for a "safety first" inspection trip, making short stops at various points for the purpose of inspecting conditions with respect to safety and to receive suggestions from the local committees. Short talks were made by J. A. Gordon, general manager; G. O. Perkins, superintendent of telegraph; G. E. Stoup, trainmaster; T. A. Sweeney, J. W. Mulhern, and C. A. Shoemaker, superintendents; G. A. Brown, superintendent of car service, and G. M. Crownover, superintendent of motive power.

The court at Buffalo, N. Y., has again postponed (to September 1) the date limiting the time during which the Buffalo & Susquehanna may be operated under the present temporary arrangement. It was September 1, 1914, when, in the receivership proceedings, the operation of the road was ordered discontinued, because of insufficient income; but negotiations for the sale of the property have been continued and now it is hoped soon to find a purchaser. It is reported that W. R. Page, of Olean, N. Y., chief owner of electric lines in that region is to take over the property and operate it in connection with the electric lines.

Daniel Willard, LL. D.

Daniel Willard, president of the Baltimore & Ohio, is now doctor of laws, that degree having been conferred on him last week by Dartmouth College, Hanover, New Hampshire. Professor Lord, in introducing Mr. Willard at the commencement exercises, alluded to his familiarity with railroad management, and his ability to set forth its principles with literary skill and convincing force; and to the fact that his wider interest in human and intellectual relations had led to his election as a trustee of Johns Hopkins University. In conferring the degree, President E. F. Nichols said:

"Daniel Willard, born among these hills, a man of rare sagacity, an acknowledged master mind, and gifted also with that higher, finer appreciation of human values, the college to which your youth aspired welcomes you in your maturity and honors your large achievements, though compassed without her aid."

Mr. Willard was born at North Hartland, Vt., in 1861. His career, with which our readers are already acquainted, may be summarized: Track laborer, fireman and engineman from 1879 to 1884; trainman, conductor, trainmaster and superintendent, 1884 to 1901; general manager, vice-president and president, 1901 to 1915.

Baltimore & Ohio Staff Meeting

At Deer Park, Md., last week, Friday and Saturday, officers of the Baltimore & Ohio, to the number of 300, led by Vice-president A. W. Thompson, held a general staff meeting, reviewing the work of the past 12 months and discussing plans for the future. The appropriations for maintenance of equipment for the fiscal year now closing will amount to $12,000,000. About 4,000 cars will be dismantled during the coming year. During the year closing 1,690,000 new ties were put in the tracks at a cost of 75 cents each, or 50 per cent more than in 1905. Over 400,000 tons of stone ballast were put into the tracks last year. The efficiency of the track forces has been increased, and they are receiving higher wages.

Officers of the traffic department reported that a brighter outlook is dawning, judging by conditions in the industrial and agricultural communities in which they are engaged. A letter from President Daniel Willard was read at the opening session, reviewing the betterments which have been made to the property during the last five years at a cost of more than $100,000,000, approximately half of which amount was spent for additional tracks and terminals, and the reduction of grades.

Mr. Thompson made an address designed to stimulate the pride of each man connected with the property. He urged loyalty at all times within the ranks, as well as a due sense of the railroad's duty to promote friendly public relations. A speaker from each department outlined his work for the enlightenment of his fellow workers in other departments. The Baltimore & Ohio glee club of forty-five voices gave a concert

at the opening of the night session, and an illustrated lecture on the Magnolia cut-off improvement was delivered by Vice-president Thompson.

J. J. Hill Professorship of Transportation at Harvard

President Lowell of Harvard University announced during the commencement exercises last week a gift of $125,000 to the university to endow the James J. Hill professorship of transportation in the Harvard School of Business Administration, contributed by 12 present or former presidents of some of the most important railways of the country, over 20 prominent bankers, and other friends of Mr. Hill in all parts of the country, to the total of 74. The gift was arranged and the sum was collected by a committee consisting of Robert Bacon, G. F. Baker, Howard Elliott, Arthur Curtiss James, Thomas W. Lamont and Robert T. Lincoln. The list of donors is as follows:

RAILROAD PRESIDENTS

William C. Brown, former president New York Central Lines, Clarinda, Ia.
Frederic A. Delano, former president Wabash, Washington, D. C.
Howard Elliott, president New York, New Haven & Hartford, Boston.
S. M. Felton, president Chicago Great Western, Chicago.
J. M. Hannaford, president Northern Pacific, St. Paul.
Fairfax Harrison, president Southern, Washington.
Hale Holden, president Chicago, Burlington & Quincy, Chicago.
L. E. Johnson, president Norfolk & Western, Roanoke.
L. F. Loree, president Delaware & Hudson Company, New York.
Samuel Rea, president Pennsylvania, Philadelphia.
F. D. Underwood, president Erie, New York.
Daniel Willard, president Baltimore & Ohio, Baltimore.

BANKERS

Robert Bacon, New York.
Everett H. Bailey, St. Paul.
George F. Baker, New York.
George F. Baker, Jr., New York.
F. A. Chamberlain, Minneapolis
H. S. Cole, St. Paul.
H. P. Davison, New York.
James B. Forgan, Chicago.
A. Barton Hepburn, New York.
Francis L. Hine, New York.
Thomas W. Lamont, New York.
L. F. Lusk, Missoula, Mont.
John R. Mitchell, St. Paul.
John J. Mitchell, Chicago.
J. P. Morgan, New York.
Charles D. Norton, New York.
Albert L. Ordean, Duluth.
William H. Porter, New York.
F. H. Rawson, Chicago.
Jacob H. Schiff, New York.
Grant B. Schley, New York.
E. T. Stotesbury, Philadelphia.
A. M. White, New York.
A. H. Wiggin, New York.

OTHER FRIENDS OF MR. HILL

Charles W. Ames, law publisher, St. Paul.
Estate of John H. Barker, Haskell & Barker Car Company, Michigan City, Ind.
E. A. Baughman, Richmond, Va.
Gebhard Bohn, White Enamel Refrigerator Company, St. Paul.
C. W. Bunn, general counsel Northern Pacific, St. Paul.
Thomas Burke, lawyer, Seattle, Wash.
William C. Butler, contractor, St. Paul, Minn.
Pierce Butler, lawyer, St. Paul, Minn.
Robert F. Carr, president Dearborn Chemical Company, Chicago.
Hovey C. Clark, lumberman, Minneapolis.
D. M. Clough, lumberman, former Governor of Minnesota, Everett, Wash.
W. H. Cottingham, president Sherwin-Williams Paint Company, Cleveland.
Otis H. Cutler, president Am. Brake Shoe & Foundry Company, New York.
William B. Dean, hardware, St. Paul.
Mrs. W. H. Dunwoody, Minneapolis.
Samuel Hill, Maryhill, Wash.
A. N. Holter, hardware, Helena, Mont.
P. L. Howe, director, Great Northern, Minneapolis, Minn.
Arthur Curtiss James, vice-president El Paso & Southwestern System, New York.
William V. Kelley, chairman American Steel Foundries Company, Chicago.
A. H. Lindeke, dry goods, St. Paul.
Robert T. Lincoln, chairman of board, Pullman Company, Chicago.
W. J. McBride, president Haskell & Barker Car Company, Michigan City, Ind.
J. T. McChesney, real estate, Everett, Wash.
Alfred H. Mulliken, president Pettibone-Mulliken Company, Chicago.
Edward A. More, St. Louis.
B. F. Nelson, lumberman, Minneapolis.
Northern Malleable Iron Company, St. Paul.
A. R. Rogers, lumberman, Minneapolis.
W. J. Rucker, lumberman, Everett, Wash.
John D. Ryan, president Amalgamated Copper Company, New York.
T. A. Schulze, boots and shoes, St. Paul.
Thomas W. Slocum, New York.
Howard C. Smith, bill broker, New York.
William B. Thompson, New York.
Samuel Thorne, director Great Northern, New York.
Theodore N. Vail, president American Telephone & Telegraph Company, New York.
F. A. Weyerhaeuser, lumberman, St. Paul.

The Western & Atlantic

Governor Slaton, of Georgia, in his message to the legislature, delivered last week, recommends legislation concerning what shall be done with the Western & Atlantic Railroad, owned by the state, the lease of which to the Nashville, Chattanooga & St. Louis will expire in 1919, or before the end of the next legislative term. Among the questions which have been under discussion in this connection have been proposals to lease a part of the property of the railroad in Atlanta and also some in Chattanooga, for outside purposes, not being needed in the operation of the railroad. The governor has appointed an agent, E. M. Durham, Jr., on behalf of the state, to participate with the officers of the Nashville, Chattanooga & St. Louis in the valuation of the Western & Atlantic in co-operation with the Interstate Commerce Commission. The North Georgia Mineral Railway is the name of a corporation, chartered last autumn, which proposes to build a railroad from Atlanta to a point in Bartow county, parallel to the Western & Atlantic. The governor raises the question of the effect which the construction of a new line would have on the value of the Western & Atlantic; and a bill has been introduced in the legislature designed to forestall any injurious competition in this field.

American Association of Railroad Superintendents

The twenty-eighth annual convention of the American Association of Railroad Superintendents is to be held at San Francisco on August 19 and 20. The convention will be opened with an address of welcome by Mayor James Rolph, Jr., of San Francisco, and there will be other addresses throughout the two days' sessions. Some of the speakers will be: William Sproule, president of the Southern Pacific; Hale Holden, president of the Chicago, Burlington & Quincy; W. R. Scott, vice-president of the Southern Pacific; A. G. Wells, general manager of the Atchison, Topeka & Santa Fe, Coast Lines; W. E. Williams, general manager of the Missouri, Kansas & Texas, who will speak on "The Railroad, a Public Servant," and W. M. Jeffers, superintendent of the Nebraska division of the Union Pacific, who will speak on "Discipline." Reports will be presented by the executive and advisory committees and also by the committees on transportation, on interchange car inspection, and on arbitration. A complimentary train, including a composite car and five sleeping cars, will be run over the Atchison, Topeka & Santa Fe and the Southern Pacific for the accommodation of members and their families, leaving Chicago on August 14, and arriving at San Francisco on August 18. The membership of the association is about 500, and it is expected to have between 150 and 200 people, including members and their families, on this train. The convention headquarters will be at the Hotel Sutter. Saturday, August 21, has been set aside by the executive committee of the Panama-Pacific International Exposition as Railroad Superintendents' Day.

Convention of the American Society for Testing Materials

The eighteenth annual meeting of the American Society for Testing Materials was held at the Hotel Traymore, Atlantic City, June 22-26, President A. W. Gibbs, chief mechanical engineer of the Pennsylvania Railroad, presiding. The address of the president and a paper by C. D. Young describing the test department of the Pennsylvania Railroad are published elsewhere in this issue and a complete report of the convention will be published next week. The following officers were elected for the coming year: President, Mansfield Merriman; vice-president, W. H. Bixby; members of the executive committee, J. H. Gibboney, W. K. Hatt, J. A. Mathews and Edward Orton, Jr.

Joint Committee on Classification of Technical Literature

The Joint Committee on Classification of Technical Literature, W. P. Cutler, secretary, 29 West 39th street, New York, is desirous of obtaining assistance in making a collection of classifications of applied science which have been developed independently in the offices of manufacturing plants, engi-

neering firms, etc., especially those which exist in manuscript form, and have been used for filing or indexing data. The committee would especially like to have copies of any extensions of present systems to cover any special industry or branch of engineering not now fully covered by the published classifications.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May 2-5, 1916, Atlanta, Ga.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—F. A. Pontious, 455 Grand Central Station, Chicago. Next meeting, July 21, 1915, Milwaukee, Wis.

AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—H. C. Boardman, D. L. & W., Hoboken, N. J. Next meeting, October 21-23, 1915, Boston, Mass.

AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, Illinois Central, East St. Louis, Ill.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—E. H. Harman, Room 101, Union Station, St. Louis, Mo. Next meeting, August 19-20, 1915, San Francisco, Cal.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Burritt, 8 W. 40th St., New York. Annual convention, October 4-8, 1915, San Francisco, Cal.

AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOCIATION.—H. G. McConnaughy, 165 Broadway, New York. Meetings with American Electric Railway Association.

AMERICAN RAILROAD MASTER TINNERS, COPPERSMITHS AND PIPEFITTERS' ASSOCIATION.—W. E. Jones, C. & N. W., 3814 Fulton St., Chicago. Annual meeting, July 13-16, 1915, Hotel Sherman, Chicago.

AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 19-21, 1915, Detroit, Mich.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 21-23, 1916, Chicago.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June, 1916.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—Owen D. Kinsey, Illinois Central, Chicago. Annual meeting, July 19-21, 1915, Hotel Sherman, Chicago.

AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Chas. Warren Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except July and August, 220 W. 57th St., New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York. Annual meeting, December 7-10, 1915, New York.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, Supt. Timber Preservation, B. & O., Mt. Royal Sta., Baltimore, Md. Next convention, January 18-20, 1916, Chicago.

ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—E. R. Woodson, Rooms 1116-8, Woodward Bldg., Washington, D. C. Annual meeting, June 28, 1916, Detroit, Mich.

ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS.—George W. Lyndon, 1214 McCormick Bldg., Chicago. Annual meeting, 2d Tuesday in October, 1915, New York.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—C. W. Egan, B. & O., Baltimore, Md.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Semi-annual meeting with Master Car Builders' and Master Mechanics' Associations. Annual meeting, October, 1915.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, Soo Line, 112 West Adams St., Chicago.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York.

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—L. D. Mitchell, Detroit Graphite Co., Chicago, Ill. Meetings with American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 Lawlor Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, Hotel La Salle, Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York, Regular meetings, 2d Friday in January, May, September and November. Annual meeting, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Traffic Manager, R. E. & P., Richmond, Va.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—C. G. Hall, C. & E. I., 922 McCormick Bldg., Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 1126 W. Broadway, Winona, Minn. Next convention, July 13-16, 1915, Sherman House, Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITH'S ASSOCIATION.—A. L. Woodworth, C. H. & D., Lima, Ohio. Annual meeting, August 17, 1915, Philadelphia, Pa.

MAINTENANCE OF WAY AND MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—T. I. Goodwin, C. R. I. & P., Eldon, Mo. Next meeting, October 19-21, 1915, St. Louis, Mo.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—A. P. Dane, B. & M., Reading, Mass. Next convention, September 14-16, 1915, Detroit, Mich.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June, 1916.

NATIONAL RAILWAY APPLIANCE ASSOCIATION.—C. W. Kelly, 349 Peoples Gas Bldg., Chicago. Next convention, March, 1916, Chicago.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, except June, July, August and September, Boston.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

NIAGARA FRONTIER CAR MEN'S ASSOCIATION.—E. N. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings 3d Wednesday in month, New York Telephone Bldg., Buffalo, N. Y.

PEORIA ASSOCIATION OF RAILROAD OFFICES.—M. W. Rotchford, 410 Masonic Temple Bldg., Peoria, Ill. Regular meetings, 3d Thursday in month, Jefferson Hotel, Peoria.

RAILROAD CLUB OF KANSAS CITY.—Claude Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Saturday in month, Kansas City.

RAILROAD MEN'S IMPROVEMENT SOCIETY.—J. B. Curran, Erie R. R., 50 Church St., New York. Meetings, alternate Thursdays, October to May. Assembly Rooms of Trunk Line Association, 143 Liberty St., New York.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 30 Church St., New York. Annual meeting, December, 1915, Waldorf-Astoria Hotel, New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, 1063 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.

RAILWAY FIRE PROTECTION ASSOCIATION.—C. B. Edwards, Fire Ins. Agt., Mobile & Ohio, Mobile, Ala. Next meeting, October 5-7, 1915, Chicago.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Myers Bldg., Bethlehem, Pa. Annual meeting, September 14-17, 1915, Salt Lake City, Utah.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, N. Y. C. R. R., Box C., Collingwood, Ohio.

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with Master Car Builders and Master Mechanics' Associations.

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 50 Church St., New York. Meetings with Association of Railway Telegraph Superintendents.

RICHMOND RAILROAD CLUB.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling, Ill. Annual meeting, September 14-16, 1915, Chicago.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.

SALT LAKE TRANSPORTATION CLUB.—R. E. Rowland, David Keith Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—Carl Nyquist, C. R. I. & P., 1134 La Salle St. Sta., Chicago. Annual meeting, September, 1915.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. R. R, Atlanta, Ga. Next meeting, July 15, 1915, Atlanta. Annual meeting, January, 1916.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Piedmont Hotel, Atlanta.

TOLEDO TRANSPORTATION CLUB.—Harry S. Fox, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.

TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle, Hotel, Chicago.

TRAFFIC CLUB OF NEWARK.—John J. Kautzmann, P. O. Box 238, Newark, N. J. Regular meetings, 1st Monday in month, except July and August, The Washington, 559 Broad St., Newark.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 291 Broadway, New York. Regular meetings last Tuesday in month, except June, July and August, Hotel Astor, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Genl. Agt., Erie R. R., 1924 Oliver Bldg., Pittsburgh, Pa. Meetings bi-monthly, Pittsburgh.

TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

TRAIN DISPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7122 Stewart Ave., Chicago.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, Superintendent's office, N. Y. C. R. R., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. R. R., East Buffalo, N. Y. Annual meeting, September 7-10, 1915, Chicago.

UTAH SOCIETY OF ENGINEERS.—Frank W. Moore, 1111 Newhouse Bldg., Salt Lake City, Utah. Regular meetings, 3d Friday in month, except July and August, Salt Lake City.

WESTERN CANADA RAILWAY CLUB.—L. Kon, Immigration Agent, Grand Trunk Pacific, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Karpen Bldg., Chicago.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings. Annual meeting, 1st Wednesday after 1st Thursday in January, Chicago.

Traffic News

The Southern Pacific has just finished at Galveston, Tex., a new 1,000,000-bu. concrete grain elevator, built at a cost of $500,000.

In suburban passenger cars on a branch of the Erie road in New Jersey passengers now see advertisements like those which are common in elevated and subway city railways.

The Denver & Rio Grande and the Rio Grande Southern will place on sale July 1, a new mileage book containing 1,000 coupons for $30, which will be good for passage of the buyer and the dependent members of his family.

The Chesapeake & Ohio announces that the sale of intoxicants has been discontinued on all of its dining and buffet cars. Prohibitory laws now prevail in a large part of the territory traversed by the lines of this company.

On July 1, the Chicago & Alton, the Chicago, Burlington & Quincy and the Nashville, Chattanooga & St. Louis established a new daily through package freight car from Chicago to Memphis, Tenn., making third morning delivery in Memphis.

Receipts for tolls on vessels passing through the Panama Canal during the month of April amounted to $442,415, or $84,112 more than the cost of operation and maintenance, not counting interest on capital investments. April was the first month in which the receipts exceeded the charges.

Pineapples from Cuba, by way of Key West, are being rushed north nowadays at the rate of 25 miles an hour. The Nashville, Chattanooga & St. Louis reports that the first 15 freight trains run for this traffic made the distance from Atlanta, Ga., to Martin, Tenn., 431 miles, in an average running time of 17 hours 16 minutes, which makes the average rate noted in the above.

The Pere Marquette has made a change in the route by which its passenger trains enter the city of Chicago. From Pine, Ind., into the city it now uses the tracks of the Baltimore & Ohio and the Baltimore & Ohio Chicago Terminal; and trains arrive in and depart from the Grand Central station. Heretofore the Pere Marquette used the tracks of the Pennsylvania for part of the distance.

Trains 39 and 54 of the Central division of the Pennsylvania now have a day-coach buffet car between Kane, Pa., and Erie, 94 miles. These are through trains which have no dining cars. The buffet occupies a space of about 8 ft. in length at one end of the car, and food is served on small tables placed between seats. Breakfast is served on train 39, westward in the morning, and supper on train 54, eastward in the evening.

Over 700 car loads of strawberries have been shipped from the East Tennessee section and points south of Chattanooga to Cincinnati and other western markets this year, according to figures of the Queen & Crescent Route, over which practically the entire crop moved. The great bulk of this freight comes from stations north of Chattanooga on the C. N. O. & T. P. The crop this year was much larger than last year, but good prices were realized, growers receiving an average of $1.75 a crate, or about $700 a car.

The Missouri Pacific has received a gold medal for its passenger traffic exhibit at the Panama Pacific Exposition, made on behalf of itself, the Denver & Rio Grande and the Western Pacific. The exhibit, heretofore described in these columns, is an immense globe, 52 feet in diameter, representing the world, the Missouri Pacific and affiliated lines being prominently shown, with miniature trains running to and fro. The interior of the globe is entered through massive arches guarded by statues, and is arranged to represent various scenic attractions along the companies' lines.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

Arguments before the commission in the western advance rate case were completed on June 26. Chairman McChord has announced that the hearings relative to the rates on various commodities scheduled to be held in Chicago on July 19 and succeeding days (*Railway Age Gazette,* June 25, page 1491) will be cancelled, as the carriers have agreed to suspend the proposed advances until September. The increases mentioned were some proposed after the hearings in the original case were begun. They were made the subject of a separate case by the commission.

The Business Men's League of St. Louis has filed a complaint against the railroads, objecting to the alleged discrimination created by the five per cent advance in freight rates and advanced passenger rates permitted by the Interstate Commerce Commission in Official Classification territory, while no advance was made between points in the state of Illinois in the territory adjacent to St. Louis. The complaint states that prior to such advanced interstate rates becoming effective, passenger and freight rates between St. Louis and points in Illinois were, generally speaking, on the same general basis as the intrastate rates. The commission is asked to require the defendant carriers to make such a readjustment of the Illinois intrastate passenger, class and commodity rates as will remove the "unjust, unreasonable, discriminatory and unduly prejudicial rates."

Transportation of Potatoes in Refrigerator Cars

Opinion by Commissioner Harlan:

In *Rental Charges for Insulated Cars,* 31 I. C. C., 255, the commission found not to be unreasonable a proposed charge of $5 per car per trip for the use of a refrigerator car in the movement of potatoes from points of origin in Minnesota and neighboring states and permitted to become effective tariffs naming rates on potatoes which contained the following provision:

Rental charge on insulated cars.—When shipper orders a refrigerator or other insulated car to be heated by him or to move without heat, a charge of $5 per car per trip will be made for the use of the car and will accrue to the owner thereof.

It has now been proposed to eliminate from the above rule the words "and will accrue to the owner thereof." The commission finds that this change should be made, it being held that the charge to avoid discrimination should be uniform and collected from every shipper who has the use of a refrigerator car. There should be no discrimination between shippers using railroads, private car lines or privately owned refrigerator cars, and the proposed rule reduces to a minimum the possibility or probability of discrimination. (34 I. C. C., 255.)

Des Moines Commodity Rates

Opinion by Commissioner Harlan:

In accordance with previous decisions of the commission the carriers have graded the 80-cent scale of class rates from Chicago to the Missouri river, back across the state of Iowa to the 37½-cent and the 41.7-cent scales of class rates at the Mississippi river. Commodity rates, however, are still based largely on the scale of rates from Chicago or St. Louis to Minneapolis and St. Paul. The commission is of the opinion that the commodity rates would be more equitable if they, too, were scaled back across the state like the class rates.

These complaints, however, were filed in behalf of Des Moines only. Without knowing the consequences to other points in Iowa, the commission does not believe that it can enter any order dealing with Des Moines commodity rates that will require a wholesale readjustment of the rates to and from other points in Iowa. It is, nevertheless, shown that several of the commodity rates to Des Moines are in need of correction and the commission suggests that a conference between the parties in interest be held to see if these rates cannot be made the sub-

ject of an agreement between them. The commission will enter an order if the parties fail to agree before August 1, 1915.

Certain complaints involving class and commodity proportional rates between Des Moines and the Mississippi river on shipments originating at or destined to points east of the Illinois-Indiana state line are dismissed in view of the fact that the entire proportional rate structure has been readjusted in accordance with the decision in the *Interior Iowa Cities case,* 28 I. C. C., 64, and 29 I. C. C., 536.

The commission also takes into consideration a number of the commodity rates in question. The rates on cherry lumber and glove leather from Chicago to Des Moines are found unreasonable to the extent that they exceed the present fourth class and second class rates, respectively. (34 I. C. C., 281.)

Shipments Billed to Intermediate Points to Secure Lower Rates

Kanotex Refining Company v. Atchison, Topeka & Santa Fe. Opinion by Commissioner Harlan:

The Kanotex Refining Company ships regularly large quantities of petroleum from its refinery at Caney, Kan., to Woodward, Okla. In order to take advantage of the substantially lower Kansas intrastate rates on refined petroleum, the complainant devised the plan of billing its tank cars to one L. B. Hill of Kiowa, the latter point being the last in Kansas intermediate to Woodward. Hill was its agent for the sole purpose of acting as the consignee of the shipments and of rebilling them from Kiowa to Woodward, and he took no actual possession.

The carrier upon learning of this plan refused further to bill the shipments from Kiowa, except at the balance of the through interstate rate, and it also presented undercharge bills for the previous shipments.

The complainant frankly admitted that the cars were billed to Kiowa and then rebilled to Woodward for the sole purpose of securing lower rates; that Woodward was the intended destination of the shipments; and that the cars were expected to move to that point as a continuous shipment, subject only to the delay incident to the rebilling at the intermediate point.

The commission finds that the carrier acted entirely within its rights and that it exercised a plain duty under the law, when it refused to continue to rebill at Kiowa the shipments involved. The commission in so deciding adheres to the proposition that on any through carriage of traffic between intertsate points the lawfully published interstate rate must be applied, and that where the through interstate rate is higher than the aggregate of the intermediate rates any plan of first billing to an intermediate point a shipment that is really intended to reach a destination beyond is simply a device for defeating the lawful through rate, and is unlawful. (34 I. C. C., 271.)

STATE COMMISSIONS

The Railroad Commission of Louisiana has ordered that, beginning with July, monthly reports of railroad accidents shall be made on forms identical with those prescribed by the Interstate Commerce Commission.

The Pennsylvania Public Service Commission has begun a series of hearings at points throughout the state, which indicates that the commissioners will not spend much time on vacations. The commission met in Scranton last week and is in Erie this week, considering grade crossing and switching cases. It will meet in Harrisburg in the week beginning July 6, in Pittsburgh the week of July 13, and in Harrisburg the remainder of the month, with hearings to be held in Philadelphia, Punxsutawney, Manheim and Williamsport.

It is probable that the superior court of Pennsylvania, at its session in Philadelphia on July 20, will be asked to pass upon the constitutionality of the act of 1915 providing for appeals from decisions of the Public Service Commission to the superior court instead of through the Dauphin county court. The primary object is to get a decision as to the effect of the act on the twenty appeals now pending in the Dauphin county court. These appeals include the anthracite rate case and a number of important railroad suits. The failure to provide in the new law for the disposition of pending appeals has caused the Dauphin county court to refuse to hear any appeals until the question is settled.

The California Railroad Commission, after an investigation, has issued an order holding that carriers have a legal right to collect an excess charge from passengers boarding trains at agency stations without tickets, provided the charge is published in their tariffs. The commission says that the manifold duties required of conductors in the operation of their trains do not permit of their spending any more than the shortest possible time in the collection of fares without more or less seriously jeopardizing the safety of the passengers; that the collection of cash fares demands considerably more additional time of the conductor than the collection of tickets, and to minimize such practice as much as possible an excess fare is just and reasonable; and that to give refund checks for the excess amount collected would only tend to considerably increase this practice. Carriers are authorized to collect an excess fare of 10 cents on amounts up to $1.45, and approximately 10 per cent on amounts over that sum up to $5; provided that no excess charge will be made where passengers have been unable to buy tickets; also, no excess fare shall be collected on electric or interurban lines.

The New York State Public Service Commission, Second district, in an opinion by Commissioner Hodson, has given a decision on the Salamanca grade crossing case, which has been before the commission for a long time and which involves a new interpretation of the grade crossing law. It is held that where, as in the present case, changes concededly needed in the railroad structure of an existing grade crossing are of such a nature as to relate back to the original plans for the elimination of the crossing they cannot be considered as maintenance and repair, for which the railroad [the Erie] alone would have to pay, but must be considered as changes in the said original plans, the cost of which, like the original work, must be divided among the municipality, the state and the railroad. This crossing presented structural difficulties in the first place due to the fact that the bridge carrying the tracks could not be raised much on account of the proximity of a large yard and the level of Main street could not be much depressed on account of difficulties of drainage. The engineers at that time sacrificed the ballast on the bridge and secured the rails to the bridge floor. But water leaked through the bridge and the old railroad commission ordered changes in the drainage to be made and assessed against all three parties to the elimination. The same trouble has again developed, and the commission will take up the case under the amended law.

PERSONNEL OF COMMISSIONS

William T. Gunnison has been appointed a member of the New Hampshire Public Service Commission in place of John E. Benton.

R. F. McLaren, secretary of the Montana Railroad Commission, has resigned. Mr. McLaren was formerly, for 17 years, in the employ of the Northern Pacific and subsequently was superintendent of the Montana, Wyoming & Southern.

COURT NEWS

The Supreme Court of Nebraska has denied the petition of the Missouri Pacific for a writ of mandamus to compel the state railway commission to issue an order increasing passenger fares within the state from 2 to 2½ cents a mile. The court was divided, four to three, the majority holding that the action of the legislature in fixing passenger rates in the state at two cents a mile is controlling, while the minority were of the opinion that when the legislature later passed a bill creating the railroad commission it gave power to the commission to change rates fixed by the legislature.

The Supreme Court of Missouri has this week sustained the demurrer of the Chicago & Alton in the suit of the attorney general of that state against the road to recover $2,000,000 for alleged excess fares collected while suits were pending relative to the law limiting all fares to two cents a mile. This action of the Supreme Court sustains that of the court of Saline county in favor of the road. The attorney general had brought similar suits against other companies claiming altogether about $24,000,000. When the Supreme Court of the United States sustained the law limiting fares to two cents, the railroads at once reduced their fares (from 2½

cents); but nothing was said about refunding the half cent a mile (above 2 cents) which had been collected while the law was in litigation.

Secret Rebates Judgment Affirmed

In an appeal from a judgment of the Pennsylvania Supreme Court (241 Pa. St. 536) awarding a shipper of coal damages for secret rebates to other shippers, the railroad company contended that part of the shipments—those to Greenwich, Pa., "included coal destined to points beyond the state," in respect of which no recovery could be had in this action. The United States Supreme Court affirmed the state court's judgment, holding that there was no evidence that any of the coal went out of the state or, if it did, that the circumstances were such that its carriage from the mines to Greenwich was in fact but part of an intended and connected transportation beyond the state. (Pennsylvania v. Mitchell Coal & Coke Company, June 14.)

Transverse Drains Law Upheld

In an action for the flooding of land in the Missouri river bottoms from the defendant's roadbed, which was not provided with transverse culverts, or openings of any kind, as required by the statute of 1907, it was argued by the defendant that the statute was invalid as an *ex post facto* law. This argument was based on a reading of the limiting clause "within three months after the completion of the same," which would make it apply to railroads already in existence. The United States Supreme Court holds that the express limit of three months applied only to railroads constructed after the passing of the act, and allowed railroads already in existence a reasonable time within which to make the openings. It also holds that the statute does not impair the obligation of the contract betwen the state and the railroad company, and is not repugnant to the "due process" and "equal protection" provisions of the Fourteenth Amendment. (Chicago & Alton v. Traubarger.)

Survival of Right to Damages for Pain and Suffering Before Death

In an action under the federal employees' liability act of 1908, as amended by the act of 1910, damages were awarded by the Arkansas Supreme Court of $1,000 for the pecuniary loss (to the father) by reason of the death and $5,000 for the conscious pain and suffering of the deceased before he died. It appeared that he survived his injuries more than half an hour, and that they were such as would naturally cause him extreme pain and suffering, if he remained conscious. This judgment is affirmed by the United States Supreme Court, which says that the original statute made no provision for a survival of the right of action for pain and suffering before death, and as that statute superseded the state statutes, many of which provided for such a survival, the act was apparently amended to make it as broad as the state statutes. While considering the award large, it involved only a question of fact and was not open to reconsideration by the Supreme Court. (St. Louis, I. M. & S. v. Craft.)

Coal Docks Not a Nuisance

A railroad, some time after the grant of a right of way from the United States in the city of Missoula, Mont., constructed thereon a coal dock. Residents in the neighborhood, who had received title to their property after such grant, sued the road for maintaining a nuisance, alleging that the dock caused coal dust to penetrate into their houses, etc. They did not allege that the dock was improperly equipped or operated. The Supreme Court of Montana held that the railroad was not liable, since the grant carried with it the right to maintain all kinds of property and do all sorts of acts necessary in constructing and operating the road, the term "railroad" fairly including all structures necessary to its operation. While cases involving coal docks are rare, the authorities are agreed that, when the grant of a right of way is made to a railroad without restrictions, it contemplates not merely the railroad as it is established in the first instance, but the road with its necessary appurtenances as it may from time to time come necessarily to be. Smith v. Northern Pacific (Mont.), 148 Pac., 393.

Railway Officers

Executive, Financial, Legal and Accounting

H. C. Ansley, treasurer of the Southern Railway at Washington, D. C., has been elected treasurer also of the Danville & Western, succeeding C. L. Booth, resigned.

Bond Anderson, assistant auditor of the Blue Ridge Railway at Anderson, S. C., has been appointed auditor of that road, also of the Danville & Western, the Augusta Southern, the Tallulah Falls and the Hartwell Railway, with headquarters at Atlanta, Ga.

Operating

J. Lowell White has been appointed assistant to general superintendent of transportation of the Atlantic Coast Line.

S. Ennes, general superintendent of the Western Maryland at Hagerstown, Md., has been appointed general manager, with office at Hagerstown, and the position of general superintendent has been abolished.

Alexander Grant has been appointed general superintendent of mail transportation of the Southern Railway, the Virginia & Southern and the Northern Alabama, with headquarters at Washington, D. C.

S. E. Cotter, general superintendent of the Wabash at St. Louis, Mo., has been appointed general manager, with headquarters at St. Louis; J. W. Jones, superintendent of terminals at St. Louis, has been appointed superintendent of the Western division with headquarters at Moberly, and C. E. Ocheltree, assistant superintendent at Forrest, Ill., succeeds Mr. Jones.

E. T. Whiter, general superintendent of the Northwest system of the Pennsylvania Lines West of Pittsburgh, at Pittsburgh, Pa., has been appointed to the new position of assistant general manager of the Pennsylvania Lines West of Pittsburgh, with headquarters at Pittsburgh. W. C. Downing, general superintendent of the Central System at Toledo, Ohio, has been promoted to general superintendent of the Northwest system, with headquarters at Pittsburgh, succeeding Mr. Whiter, and I. W. Geer, superintendent of the Cleveland and Pittsburgh division at Cleveland, has been promoted to general superintendent of the Central system, with office at Toledo, succeeding Mr. Downing.

Franklin P. Brady, whose appointment as general superintendent of the National Transcontinental, in charge of the section between Quebec and Winnipeg, and of the Lake Superior branch of the Grand Trunk Pacific between Fort William and Superior Junction, with headquarters at Cochrane, Ont., has already been announced in these columns, was born on June 22, 1853, at Haverhill, N. H., and was educated at Newbury Seminary, Newbury, Vt. In May, 1869, he began railway work on the Connecticut & Passumpsic Rivers, now a part of the Boston & Maine, and to February, 1873, served consecutively as station baggage master and telegraph operator at Lyndonville, Vt. He was then train despatcher on the Northern New Hampshire, now a part of the Boston & Maine at Concord, N. H., and from 1880, to November, 1887, was chief train despatcher on the South-Eastern Railway, now a part of the Canadian Pacific at Farnham, Que. He subsequently became trainmaster on the same road, and from July, 1888, to May, 1896, was assistant superintendent of the Canadian Pacific. He was then to May, 1901, superintendent of the same road, with headquarters at Smith's Falls, Ont., and later served as superintendent at Toronto, Ont., and at Fort William until May, 1903, when he was appointed assistant general superintendent of the same road at Winnipeg, Man. In February, 1904, he was appointed general superintendent at North Bay, Ont., remaining in that position until September, 1908. The following May, he became a member of the Government Railways Managing Board and general superintendent of the Intercolonial and the Prince Edward Island Railways. In June, 1913, the Government Railways Managing Board was abolished, and since that time Mr. Brady served as general superintendent of the Canadian

Government Railways, until his recent appointment as general superintendent of the National Transcontinental as above noted.

Traffic

J. D. Kenworthy, assistant general freight agent of the Denver & Rio Grande, at Pueblo, Colo., has been transferred to Salt Lake City, Utah, in the same capacity, succeeding S. V. Derrah, deceased.

Thomas F. Hartnett, commercial agent of the Cleveland, Cincinnati, Chicago & St. Louis, at Toledo, Ohio, has been appointed to the newly created office of Pacific agent, with headquarters at San Francisco, Cal. W. F. Benning has been appointed to succeed Mr. Hartnett.

George H. Eaton, general freight agent of the Boston & Maine at Boston, Mass., has been appointed assistant freight traffic manager; William T. Lamoure, assistant general freight agent at Boston, has been appointed general freight agent, and Emery W. Abbott, division freight agent at Troy, N. Y., has been appointed assistant general freight agent.

R. M. Burr, traveling passenger agent of the Cincinnati, New Orleans & Texas Pacific at Cleveland, Ohio, has been promoted to district passenger agent, with headquarters at Cleveland, and the office of traveling passenger agent has been abolished. J. C. Volz, traveling passenger agent at Cincinnati, has been promoted to central passenger agent, with headquarters at Cincinnati, and the office of traveling passenger agent has been abolished. A. C. Mathias has been promoted to northern passenger agent, with headquarters at Chicago.

Engineering and Rolling Stock

J. S. Sheafe, master mechanic, Staten Island Lines of the Baltimore & Ohio at Clifton, Staten Island, N. Y., has been granted leave of absence for one year.

E. F. Vincent, assistant chief engineer of the Colorado & Southern, has been appointed chief engineer, with headquarters at Denver, Col., succeeding H. W. Cowan, deceased.

W. M. Bosworth, mechanical engineer of the Louisville & Nashville, at Louisville, Ky., has been appointed mechanical engineer of the Norfolk Southern, with office at Berkley, Va.

Frank E. Wilmore has been appointed assistant road foreman of engines of the Pennsylvania Lines West of Pittsburgh, with headquarters at Fort Wayne, Ind., succeeding Robert J. Lyons, assigned to other duties at his own request.

A. H. Mahan, locomotive foreman of the Grand Trunk Pacific at Prince George, B. C., has been appointed general locomotive foreman in charge of territory from Prince George to Edmonton, Alta., including intervening branch lines; J. F. Moffatt, road foreman at Wainwright, Alta., has been appointed general locomotive foreman in charge of the territory from Transcona, Man., to Fort William, Ont.; H. R. Simpson, road foreman at Jasper, Alta., has been appointed general locomotive foreman in charge of the territory from Watrous, Sask., to Winnipeg, Man., including intervening branch lines; W. G McConachie, road foreman at Edmonton, Alta., has been appointed general locomotive foreman in charge of the territory from Edmonton to Watrous, including intervening branch lines, and A. Watt, general foreman at Prince Rupert, B. C., has been appointed general locomotive foreman in charge of the territory from Prince Rupert to Prince George. D. W. Hay has been appointed locomotive foreman, with office at Prince George, B. C., succeeding A. H. Mahan, and J. A. Miller has been appointed locomotive foreman at Endako, succeeding G. H. Laycock, transferred to Jasper, Alta.

OBITUARY

James J. Goodwin, a director of the Erie, died on June 23, at Hartford, Conn., at the age of 80.

William M. Hughes, formerly consulting engineer of the New York, Chicago & St. Louis, and at one time bridge engineer of the city of Chicago, died at his home in Chicago, on June 25.

Equipment and Supplies

LOCOMOTIVE BUILDING

THE INTERCOLONIAL RAILWAY OF CANADA has ordered 15 locomotives from the Canadian Locomotive Company.

THE ISTHMIAN CANAL COMMISSION, Major F. C. Boggs, general purchasing officer, will receive sealed proposals until August 16 for 12 electric towing locomotives for canal locks.

THE CAROLINA, GREENEVILLE & NORTHERN, an electric line, F. A. H. Kelley, chief engineer, Greeneville, Tenn., is preparing specifications for motive power and rolling stock. See item under Railway Construction.

CAR BUILDING

CAROLINA, GREENEVILLE & NORTHERN. See item above under Locomotive Building.

THE GREAT NORTHERN has ordered 500 box cars from the Haskell & Barker Car Company.

THE NORTHERN PACIFIC has ordered 750 center constructions and 750 sets of draft sills from the Western Steel Car & Foundry Company.

THE BALTIMORE & OHIO is in the market for 35 coaches, 5 passenger and baggage cars, 2 combination baggage and mail cars, 4 baggage cars, 2 parlor-cafe cars and 2 cafe coaches.

THE CHICAGO, BURLINGTON & QUINCY is inquiring for 1,500 to 2,000 40-ton steel underframe box cars. This company is also reported to have asked bids on 55 coaches and 10 dining cars.

THE INTERCOLONIAL has ordered 650 80,000-lb. capacity box cars from the Canadian Car & Foundry Company, and 350 80,000-lb. capacity box cars from the National Steel Car Company.

THE CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA has ordered 750 box cars from the American Car & Foundry Company, and 750 from the Haskell & Barker Car Company. It is also inquiring for 100 refrigerator cars.

THE INTERNATIONAL & GREAT NORTHERN, which was reported in the *Railway Age Gazette* of June 11 as negotiating for 1,000 freight cars with the Mount Vernon Car Manufacturing Company, has ordered 500 box cars, 200 stock cars and 300 gondola cars from that company.

THE CHICAGO & NORTH WESTERN has ordered 10 coaches, 3 smoking cars and 10 60-ft. baggage cars from the American Car & Foundry Company, 3 70-ft. baggage cars, 10 70-ft. combination baggage and mail cars, 2 reclining chair cars, 5 combination baggage and passenger cars, 4 parlor cars and 2 dining cars from the Pullman Company, and will also place orders for 5 more passenger cars.

IRON AND STEEL

THE EL PASO & SOUTHWESTERN has ordered 8,000 tons of 90-lb. rail from the Colorado Fuel & Iron Company.

THE CHICAGO, MILWAUKEE & ST. PAUL has ordered 585 tons of steel from the Federal Bridge Company for five 105-ft. spans.

THE NEW YORK PUBLIC SERVICE COMMISSION, First district, will advertise for bids, to be opened July 16, for 40,200 tons of rail for equipping new rapid transit lines of the dual system.

THE SIAMESE ROYAL RAILWAY DEPARTMENT invites bids for three steel viaducts. Specifications and drawings may be obtained from the Siamese Legation at Gloucester, Mass., on payment of a fee of $4 for each set.

THE UNION STATION COMPANY, Chicago, has ordered 1,150 tons of steel for its Monroe street bridge from the Chicago Bridge & Iron Company, and 155 tons for the machinery of this bridge from the Allis-Chalmers Company.

Supply Trade News

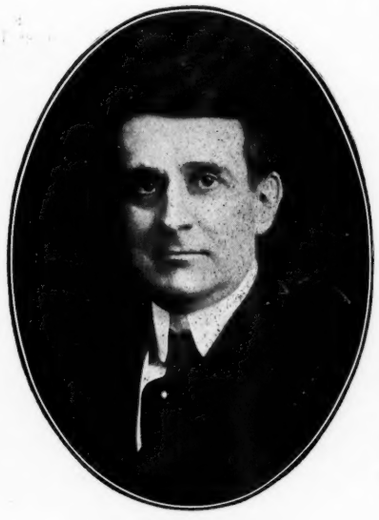
The Linde Air Products Company, New York, is completing plans for a one-story 80-ft. by 100-ft. plant to be erected at Milwaukee, Wis., at a cost of $30,000.

H. F. Dow, for a number of years superintendent of the screw-machine department of the United Shoe Machinery Company, Beverly, Mass., and later a member of the firm of Babson-Dow Manufacturing Company, Boston, has recently been placed in charge of the automatic department of the American Steam Gage & Valve Company, Boston, Mass.

The Allegheny Steel Company, Pittsburgh, Pa., has completed plans to enlarge its plant at Brackenridge, Pa., for the manufacture of pressed steel side frames for steel cars. Material for the new addition will be furnished by the 100-inch plate mill of the company. Several new buildings will be erected, including one 90 ft. by 126 ft., one 60 ft. by 120 ft., and two 30 ft. by 135 ft.

The Standard Steel Car Company intends to make some large additions to its New Castle, Pa., plant. A contract has already been given to the McClintic-Marshall Company for the steel for a new building to replace a structure destroyed last fall by fire. A large amount of new equipment will be installed, and it is planned to build steel cars complete. Hitherto only parts of the cars were made and assembled for finishing at Butler, Pa.

Edward M. Hagar, whose election as president of the Hagar Portland Cement Company, was announced in this column last week, was graduated from the Massachusetts Institute of Technology in 1893. In 1894 he received a master's degree from Cornell University for postgraduate work done at that school. He then came to Chicago and formed the corporation known as Edward M. Hagar & Co., which acted as agent for several machinery manufacturers. In 1899 he was appointed manager of the cement department of the Illinois Steel Company. The manufacture and sale of Universal Portland cement was carried on by the Illinois Steel Company until 1906 when the Universal Portland Cement Company was formed with Mr. Hagar as its president. Under his management the manufacture of Universal increased from 32,000 barrels in 1900 to 12,000,000 barrels in 1914. Mr. Hagar resigned the presidency of the Universal Portland Cement Company in February of this year to form a new company for the purpose of acquiring a chain of Portland cement plants extending across the country.



E. M. Hagar

The International Jury of Award of the Panama-Pacific International Exposition has awarded to the Western Electric Company the following medals for its exhibit in the Palace of Manufacturers: the Grand Prix for the exhibit as a whole; gold medals for telephone switchboards and equipment, for telephone train despatching and control apparatus and for insulated wires and cables and two bronze medals for mine rescue equipment and mine telephones.

Frank C. Rose, formerly purchasing agent of the Foundation Company, Ltd., Montreal, has been appointed general purchasing agent of W. S. Barstow & Co., Inc., engineers and managers, New York, operating the General Gas & Electric Company and the Eastern Power & Light Corporation. Previous to his connection with the Foundation Company, Ltd., Mr. Rose was assistant purchasing agent of J. S. White & Co. and prior to that general confidential assistant to the purchasing agent of the Delaware, Lackawanna & Western.

The United Railway Specialties Company, 30 Church street, New York, has been appointed representative of Mudge & Co., Chicago, in the New England, eastern and southern states. Representation will cover Mudge motor cars, Mudge-Peerless ventilators and the Mudge-Slater removable box front end for locomotives. The United Railway Specialties Co. is a comparatively new company. Its officers are: R. A. Patterson, president; H. M. Buck, treasurer, and John B. Given, vice-president. Mr. Patterson was for a number of years associated with Fairbanks-Morse & Co., Chicago, in charge of the railroad department of their New York office. Mr. Buck has been associated with the Railway Supply Company, Chicago, for many years as eastern representative. Mr. Given was at one time in the service of the Duplex Metals Company and is now also associated with the Galena-Signal Oil Company. The United Railway Specialties Company, in addition to representing Mudge & Co., also represents the National Standard Company, Niles, Mich.; the W. E. Caldwell Company, Louisville, Ky.; the Continental Fibre Company, Newark, Del.; the William Robertson & Co., Chicago; the Railway & Traction Supply Company, Chicago, and a number of other companies.

Charles B. McElhany, general manager of sales of the Cambria Steel Company, has been elected also a vice-president of that company. Mr. McElhany has been in the steel business for about 20 years, and in the service of the Cambria Steel Company for four years. His early years in the steel industry were spent in the employ of the Braddock Wire Company, the American Steel & Wire Company, the Union Steel Company and the Pittsburgh Steel Company. About nine years ago he entered the service of the Colorado Fuel & Iron Company, becoming assistant general manager of sales of that company. He then became assistant manager of sales of the Cambria Steel Company, in charge of the wire division. He was later appointed assistant general manager of sales, and on March 1 succeeded J. L. Replogle as general manager of sales.

C. B. McElhany

Two court decisions have recently been handed down relative to infringement of patents held by the Safety Car Heating & Lighting Company, New York. In the suit of the Safety Car Heating & Lighting Company v. the United States Light & Heating Company, the circuit court of appeals has affirmed the decision of Judge Hazel of the western district of New York, which held that the first eight claims of the Creveling patent No. 747,686, owned by the Safety Car Heating & Lighting Company, which were the only claims involved in the suit, were valid, that they were entitled to a broad interpretation, and that they were infringed by both the taper charge and stop charge systems of the defendant. The Safety Car Heating & Lighting Company believes that this patent as thus adjudicated covers not only the systems of the United States Light & Heating Company, but also practically all modern systems now in use on the railroads of this country. In the case of the Safety Car Heating & Lighting Company v. the Gould Coupler Company, in which the Safety Car Heating & Lighting Company sued for infringement of the patent to H. G. Thompson, No. 1,070,080 which it holds, patent claims 4, 9, 10, 11, 12 and 13 were alleged to be infringed by the Simplex system of the Gould Coupler Company in

both the constant battery current and constant generator current forms. Judge Hazel of the United States court for the western district of New York at Buffalo, holds all the claims valid and all infringed by both the constant battery current system and the constant generator current system of the Gould coupler Company.

Harrison G. Thompson, whose appointment as general sales manager of the Edison Storage Battery Company, Orange, N. J., was announced in this column last week, has been in the service of that company since July, 1910, and a vice-president of it since July, 1913. Mr. Thompson was born at Weston, Mass., in 1875. In 1896 he entered the service of the Pullman Company and after having been with that company for two years was made foreman of electricians. In 1900 he resigned to become foreman of the battery department of the Riker Motor Vehicle Company, but left the latter at the time of its absorption by the General Vehicle Company, of Hartford, Conn., to become associated with W. L. Bliss, one of the pioneers in electric car lighting development. In 1905 he entered the service of the Pennsylvania Railroad and was placed in charge of electric car lighting with headquarters at Jersey City, N. J. About one year later he became electrical superintendent of the Safety Car Heating & Lighting Company, New York, and was in charge of that company's electrical laboratories during the development of its first electric car lighting system. In December, 1909, he was appointed manager of the railroad department of the Westinghouse Storage Battery Company and later for a short time was in the employ of the United States Light & Heating Company, New York. In July, 1910, he became manager of the railway department of the Edison Storage Battery Company.

H. G. Thompson

TRADE PUBLICATIONS

Electrical Testing Service.—The Electrical Testing Laboratories, Inc., New York, have recently issued an attractive loose-leaf booklet describing the equipment, organization and work of these laboratories.

Passenger Car Couplers.—The McConway & Torley Company, Pittsburgh, Pa., has recently issued an eight-page booklet descriptive of the Pitt passenger coupler. In addition to an illustration of the coupler, the booklet also contains three drawings showing the coupler's great flexibility of curvature. Figure 1 shows the limits of such flexible movement; figure 2, the extreme positions to which the couplers will adjust themselves in passing over a curve and tangent, and figure 3, the relative positions on a reverse curve.

Connecting Devices for Wiring.—The Fargo Manufacturing Company, Inc., Poughkeepsie, N. Y., has issued three very full and complete catalogs of its connecting devices for wiring of all kinds. These devices are designed to be the very best of their class, both for strength and for quality of workmanship. Catalog No. 700 showing types A and B illustrates the straight connection, type A 3; the steel cable grip type A 4; steel guy grip; a cable lug; cable grip type A, and straight connection, type B. Bulletin No. 402 shows an insulated case for a straight connection, a bus bar connection grounding devices and tee and ell connections. Catalog No. 800 shows these and other devices with large illustrations and additional details of the uses to which they may be put. Ground and terminal connections are shown in great variety.

Railway Construction

Alamance, Durham & Orange Railway & Electric Company.—Plans have been made to build an electric line from Altamahaw and Ossipee, twin manufacturing villages in the northwestern section of Alamance county, N. C., in a southeasterly direction through the manufacturing villages of Hub Mills, Glencoe, Carolina and Hopedale, thence via Burlington, Graham, Swepsonville, Saxapahaw and Chapel Hill to Durham, about 50 miles. Contracts for building the line will probably be let in November. J. H. Harden, president, Burlington, and H. G. Palmer & Co., Yorkville, Ill., and office at Burlington, N. C., are the engineers.

Americus, Flint River & Gains.—The city council of Americus, Ga., has given a franchise to the Georgia Lumber Company to operate a railroad into Americus. The company has the right of way secured, it is said, for a line to be about 25 miles long, and construction work is to be started before September. The projected route is from Byromville, Ga., west across the Flint river, thence to Americus, and the plans call for putting up a steel bridge over the Flint river. It is proposed later to extend the line which will probably be built under the name of the Americus, Flint River & Gains. The headquarters of the company are at Americus, and it is said that the plans call for establishing shops at that place.

Calhoun County Railway.—This company proposes to build a railroad from Pearl, Ill., to run south through Bee Creek, Cliffdale, Kampsville, Hamburg, Batchtown and Brussels to Golden Eagle. Grading in the district of Hardin, Ill., is in progress, and it is expected track laying will begin about August 15. The general contracts have been awarded to the Western Illinois Development Company. John E. Melick, Kampsville, Ill., is president and chief engineer of the railroad.

Carolina, Greeneville & Northern (Electric).—A contract has been given to A. H. Jacoby, Greeneville, Tenn., for some of the work on this line. The company plans to build from Bristol, Tenn., west to Kingsport, thence southwest via Newport and Sevierville to Knoxville, about 140 miles. The maximum grade will be 1.5 per cent, and the maximum curvature 10 deg. There will be three steel bridges aggregating 1,500 ft. on the line. The company expects to develop a traffic in lumber, iron ore and coal. H. S. Reed, president, Los Angeles, Cal.; F. A. H. Kelley, chief engineer, Greeneville, Tenn. (June 11, p. 1265.)

Charleston Southern.—Under this name a line is projected from the Carolina, Atlantic & Western at Charleston, S. C., southwest to Savannah, Ga., 86 miles. The company has not yet been incorporated. G. E. Dargan and B. Williamson, Darlington, S. C., also J. E. Evans, Florence, S. C., are interested.

Chesapeake & Curtis Bay.—Incorporated in Maryland with $50,000 capital, it is said, to build a line at Curtis Bay and at East Brooklyn suburbs of Baltimore to connect with the Baltimore & Ohio. The incorporators include R. D. Upham, New York; J. C. Boyd, Baltimore; J. H. Zink and R. B. Pue.

Florence & Huntsville Interurban.—According to press reports from Florence, Ala., the Lauderdale Power Company is promoting the construction of this line. The plans call for building from Florence east via Athens to Huntsville, about 75 miles, and about 12 miles of spur lines. (September 25, p. 587.)

Keokuk, Rock Island & Chicago.—This company proposes to build a railroad from a point on the Chicago, Burlington & Quincy near Keithsburg, Ill., to a point opposite Muscatine, Iowa, and thence to Chillicothe, Ill., a distance of about 130 miles. Several bridges will be required. M. J. Healy, Joy, Ill., president and chief engineer, would like to hear from contractors.

Montreal & Southern Counties (Electric).—An officer writes that work was resumed on June 1, on the extension from St. Cesaire, Que., to Granby, 15 miles. This work was first started in May, 1914, and was shut down in August of the same year. Track has already been laid on three miles. Grant, Campbell & Company, St. Cesaire, are the contractors. There

will be five short wooden pile trestles on the line, also car-barns and substation at Granby, and a station at Abbotsford. (January 15, p. 116.)

NEW YORK CONNECTING.—This company has given contracts to the Wilson & English Construction Company, New York, for the construction of Section 1, and to P. McManus, Incorporated, Philadelphia, Pa., for the construction of Section 2. This work is for the sections of the New York Connecting Railroad between Bowery Bay Road and the Long Island Railroad at Fresh Pond Junction, in the borough of Queens, New York. (May 28, p. 1139.)

NEW YORK SUBWAYS.—The New York Public Service Commission, First district, will open bids on July 20, for the construction of Section No. 1 of Route No. 49, a part of the Culver rapid transit railroad. Section No. 1 extends from a point in Thirty-seventh street 246 ft. southeast of Tenth avenue under private property and intersecting streets to Gravesend avenue and over Gravesend avenue to a point about 525 ft. south of Bay Parkway (Twenty-second avenue) produced.

NORFOLK, WASHINGTON & NEW YORK.—An officer writes that this company has secured most of the right of way on the section between Riverside, Va., and Sheperd's, D. C. The company plans to build from Newport News, Va., north via Washington, D. C. Channing M. Ward, president, Richmond, Va.

NORTH CAROLINA ROADS.—Plans are being made, it is said, to build a line from Rurtherfordton, N. C., southwest to Columbus, about 15 miles. L. D. Miller, Rutherfordton, may be addressed.

NORTH GEORGIA MINERAL.—Surveys are reported under way on about 25 miles for a line from Atlanta, Ga., north to a point in Bartow county. Application was made by this company for a charter in Georgia last year with a capital of $1,250,000, to build from Atlanta, northwest through the counties of Fulton, Cobb, Cherokee and Bartow, about 50 miles. W. J. Morrison, A. C. King, J. J. Spalding, Atlanta, are interested. (September 25, p. 587.)

OZARK SOUTHERN.—This company has projected a line from Harrison, Ark., it is said, south to Jasper and Parthenon, about 20 miles. The line may eventually be extended south of Parthenon. G. W. T. Shaw, Lee Center, Ill., is consulting engineer, and W. T. Allen, Jacksonville, Ala., and F. B. Moody are interested

PENNSYLVANIA RAILROAD.—A short branch line is to be built at Steelton, Pa., to reach some industries without using main line track as at present.

SOUTHERN PACIFIC.—This company announces that the work between Eugene, Ore., and Marshfield is nearly completed. There remains some bridge work which is now in progress, after which there will be some trestle work, track laying and ballasting to complete.

STATESVILLE AIR LINE.—Financial arrangements are now being made, it is said, to carry out work on this line. The plans call for building from Statesville, N. C., north via Harmony to Houstonville, about 25 miles. Grading has been finished on about 20 miles, and track laying may be started soon. W. D. Turner, president; W. Wallace, vice-president; D. M. Ausley, treasurer and general manager.

TENNESSEE ROADS (Electric).—Plans are being made to build an electric line, it is said, from a connection with the Nashville, Chattanooga & St. Louis at Lebanon, Tenn., southeast to Smithville, about 35 miles. C. Edwards, representing White & Company, Chicago, Ill., is said to have made arrangements for building the line. J. T. Odum, Lebanon, may be addressed.

RAILWAY STRUCTURES

AUGUSTA, GA.—An officer of the Georgia & Florida is quoted as saying that the company will start work at once on a new passenger station at Twiggs and Calhoun streets in Augusta. The company was granted permission recently by the Railroad Commission of Georgia to discontinue use of the union station in Augusta, and to build a new station.

BROOKLYN, N. Y.—Contracts for the construction of eight elevated railroad stations in connection with the third-tracking of the Broadway elevated railroad in the borough of Brooklyn have been approved by the New York Public Service Commission, First district.

CLAREMORE, OKLA.—The St. Louis, Iron Mountain & Southern contemplates building a new depot at this place. No definite decision has yet been reached as to the size of the building, or when it will be constructed.

COLEMAN, TEX.—The Gulf, Colorado & Santa Fe has awarded the contract for the construction of a brick and stucco depot at this point to H. D. McCoy, of Cleburne, Tex.

DALLAS, TEX.—The Dallas Union Terminal Company will construct a heat, light and power plant to supply the terminal now being built at that place. The estimated cost is $60,000.

FROSTBURG, MD.—A contract has been given to the Luten Bridge Company, York, Pa., to build a 44-ft. concrete span bridge over the Cumberland & Pennsylvania tracks at Bowery street, Frostburg. The town of Frostburg and the Cumberland & Pennsylvania will jointly pay for the improvements, which are to cost $5,340.

HERR'S ISLAND, PA.—A contract has been given by the Pennsylvania Railroad to the Bailey & Lush Company, Philadelphia, at $150,000 for building a double-deck stock pen on Herr's Island.

HOPEWELL, VA.—An officer of the Norfolk & Western writes regarding the construction of a new freight warehouse at Hopewell, Va., that nothing definite has been decided as to the construction of this warehouse. It will probably be of frame construction and the work may be carried out by company forces.

KANSAS CITY, MO.—The Chicago, Burlington & Quincy has awarded the contract for the steel work of its Kansas City bridge to the American Bridge Company. The contract calls for 5,500 tons of steel.

MANSFIELD, OHIO.—Plans are being made by the Erie for building an addition, 40 ft. by 50 ft. to the freight house at Mansfield, at a cost of between $8,000 and $9,000.

PHOENIXVILLE, PA.—The Pennsylvania Railroad has given a contract to the James McGraw Co., Philadelphia, Pa., for building the concrete arch bridge at Campbell's Crossing, west of Frick's lock. The bridge is to consist of seven 84-ft. concrete arches for double track. (June 11, p. 1266.)

RIDGEWOOD, N. J.—The Erie has given a contract to the Corning Building Company, Corning, N. Y., for building a new station at Ridgewood. Another contract has been given to Arthur McMullen, New York, for constructing a pedestrian subway and the approaches to the new station, also for the paving, etc.

RAILWAY PROPERTY IN ASIA MINOR.—A telegram from Constantinople received in Amsterdam via Berlin states that it is reported in competent circles that the Porte has decided to abolish the Turco-French financial agreement drafted last year, the execution of which would have impeded the future development of the Hedjaz Railway. The government has decided to buy back all railway property in Syria and in the Lebanon district which is the property of alien enemies.

RAILWAY EXTENSION IN INDIA.—The Indian Railway Board has sanctioned the following new construction: the construction by the South Indian Railway, on behalf of the District Board of Tanjore, of a branch meter-gage line between Tiruturaipundi, a station on the South Indian Railway and Vedaraniam, a distance of about 23 miles; a survey by the agency of the Darjeeling-Himalayan Railway for a line between Thakurgunge and Sikti, a distance of about 44 miles; the construction by the Bengal Provincial Railway of a 2-ft. 6-in. gage line between Dasghara station on the Bengal Provincial Railway, and Jamal Purgunj, a distance of about 8 miles; a survey by the Assam-Bengal Railway administration for meter-gage lines between Karimganj into the Longai Valley and Hathikheri, with a branch into the Chargola Valley, length about 44 miles, and between Silchar and Dwarbund, with branch to Sonaimukh and Dhalai, a length of about 30 miles. On the Great Indian Peninsula Railway the four trading lines up to Kalyan have made good progress, but the completion of the work will be delayed, owing to the war.

Railway Financial News

Alabama & Mississippi.—This company has leased the Pascagoula, Moss Point & Northern. The Alabama & Mississippi runs from Vinerga Bend, Ala., to Leaksville, Miss., 17 miles, and the Pascagoula, Moss Point & Northern runs from Pascagoula, Miss., to Evanston.

Boston & Maine.—President Hustis gave out the following statement after a meeting of the executive committee of the Boston & Maine, held on June 29:

"There is no friction between the directors of the Boston & Maine Railroad and the committee representing the leased line interests. This committee, of which Richard Olney is chairman, is fully alive to the importance of avoiding a receivership and is working to that end. They realize if receivership is to be avoided legislation must be secured in New Hampshire and that to secure legislation in New Hampshire the leased line interests must be practically a unit requesting it.

"The statement that because of a steady improvement in net earnings, reorganization is unnecessary, and that there will be no need of a receivership in case reorganization is not effected should not be regarded seriously. It is understood by all interests that no plan short of a permanent reorganization and one that will restore credit to the road will avail.

"It is true that net results of operation as compared with last year are continuing to show a favorable tendency. The report for the 11-months' period, published today in face of a loss in the operating revenue of $1,335,000, shows a shortage of only $773,000 in the amount required to pay fixed charges as against a shortage of $2,186,000 for the same period of the previous year; but regardless of this favorable showing it is apparent that fixed charges will not be earned this fiscal year, although the result would have been more favorable had not track work been started earlier this year than last."

Chairman MacLeod, of the Massachusetts Public Service Commission, gave out on June 29 the following statement:

"The present corporate body of the Boston & Maine Railroad is a menace to any sound reorganization; the Public Service Commission does not favor any receivership if it can be avoided, but a reorganization on a sound basis. In conformity with the law as passed by the legislature, the stockholders may negotiate with the leased line interests, but any deal consummated must be within a capitalization fixed under the enabling act.

"Until the Boston & Maine gets rid of the fixed charges that it is now under there cannot, in my opinion, be any healthy reorganization effected. The road must be reorganized on such a basis that it will be able to weather any time of future stress."

Chicago, Rock Island & Pacific.—Judge Carpenter, in the United States district court, has authorized the receivers to issue $2,500,000 5 per cent receivers' certificates, the proceeds to be used to pay interest due on July 1 on underlying bonds. The issue of certificates was opposed by Samuel Untermyer, representing the Amster interests, but the objections were overruled by Judge Carpenter. The receivers' certificates were sold to the First National Bank of New York.

The following have formed a protective committee to represent the interests of the first and refunding mortgage bonds: Charles A. Peabody, president of the Mutual Life Insurance Company, chairman; Allen B. Forbes, of Harris, Forbes & Company, New York; W. A. Day, president of the Equitable Life Assurance Society; A. J. Hemphill, chairman of the board of directors of the Guaranty Trust Company, and Alfred W. Harris, president of the Harris Trust & Savings Bank, Chicago.

Florida Railway.—William B. Winslow, of New York, has been appointed receiver of the Florida Railway by United States District Judge Hand. The receivership suit was brought by Carl J. Sauer on the part of certain bondholders because it was alleged that the Union Trust Company of Florida, which was to have acted as trustee for the bonds, never qualified as trustee. The Florida Railway runs from Live Oak, Fla., to Jacksonville and Fernandina.

Hocking Valley.—A dividend of 1 per cent has been declared, payable June 30. Six months ago 3 per cent was declared. This makes a total of 4 per cent for the year.

New Orleans, Mobile & Chicago.—The United States district court has ordered the sale of the New Orleans, Mobile & Chicago under foreclosure within the next two months. A petition to intervene in the receivership proceedings made by L. S. Berg, formerly president of the company, and representatives of French bondholders was denied.

New York Central.—Residents of Yonkers have, after making an attempt to persuade the New York Central to electrify the Yonkers branch, made the railroad company tentative propositions looking to buying this branch and themselves electrifying it and operating it. The cost of electrification has been estimated at from $450,000 to $500,000.

Pascagoula, Moss Point & Northern.—See Alabama & Mississippi.

Pennsylvania Railroad.—This company now has over 93,000 stockholders, of whom 44,848, or 48.22 per cent, are women. This is an increase in the total number of stockholders of 3,158 as compared with June, 1914. The women stockholders, while aggregating in number 48.22 per cent of the total stockholders, hold 28.09 per cent of the stock, the average holdings per woman stockholder being 63 shares.

St. Louis & San Francisco.—The bondholders' protective committee representing the first and refunding 4 per cent bonds, has made arrangements to advance the interest due on July 1 on these bonds to holders who have deposited their bonds with the committee.

Southern Pacific.—The Supreme Court of the United States on Monday handed down a decision holding that the 2,300,000 acres of land located in Oregon and granted to the Oregon & California Railroad Company, a subsidiary of the Southern Pacific, is not forfeited to the government and that the Southern Pacific is entitled to hold this land, but an injunction is issued preventing the railroad company from selling it for a period of six months pending further action by Congress.

The Southern Pacific will operate beginning with July 1 as part of its Pacific system the properties of the Corvallis & Eastern; Portland, Eugene & Eastern; Coos Bay, Roseburg & Eastern; Pacific Railway & Navigation, and Salem, Falls City & Western.

Wabash.—The sale of this property, which had been set for June 23, has been postponed upon the application of the Equitable Trust Company, New York, to July 8.

Wabash-Pittsburg Terminal.—The reorganization committee, of which James N. Wallace, of the Central Trust Company of New York, is chairman, has submitted to securityholders a plan of reorganization. This plan provides for a reduction in the par value of securities and outstanding indebtedness from $91,000,000 to $44,000,000. Of the former capitalization $81,000,000 was bonds. This would be reduced to $5,000,000, reducing fixed charges from $2,783,000 to $261,000 annually. The new securities to be issued will consist of $9,100,000 6 per cent preferred stock, cumulative after January 1, 1921, and $30,500,000 common stock, and the $5,000,000 underlying bonds will remain undisturbed.

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Dublin Railway Strikes.—Some 200 men left their work at Broadstone Railway Station on Monday, June 14, without notice. Many of them are members of the Irish Transport Union. Some 50 men failed to resume work on Monday morning at the locomotive and car shops of the Dublin & South-Eastern at Upper Grand Canal street, following an application for an advance of 6s. ($1.50) per week in wages. The men belong to the Transport Union, which sought to secure the advance. The directors of the Midland Great Western decided on June 15 to grant a war bonus to their employees, i. e., 1s. (25 cents) a week to those earning 12s. ($3) a week or less; to members of the clerical and wages staff (1) receiving more than 12s. and not exceeding 30s. ($7.50), 1s. 6d. (38 cents) a week, (2) receiving more than 30s. and not exceeding 39s. ($9.75), 1s. a week.